State of Vermont
Agency of Natural Resources
Department of Forests, Parks and Recreation
Department of Fish & Wildlife
Department of Environmental Conservation

Mt. Philo State Park

Long Range Management Plan

Charlotte, Vermont
232 acres

Prepared by: Rutland Stewardship Team

Approved by: _____ _____
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Approved by: _____ _____
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(Date of LRMP Template: 8/26/2015 TM/LT/MMC)

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Mission Statements

Vermont Agency of Natural Resources

The mission of the Agency of Natural Resources is "to protect, sustain, and enhance Vermont's natural resources, for the benefit of this and future generations."

Four agency goals address the following:

- To promote the sustainable use of Vermont's natural resources;
- To protect and improve the health of Vermont's people and ecosystems;
- To promote sustainable outdoor recreation; and
- To operate efficiently and effectively to fulfill our mission.

Departments

Vermont Department of Environmental Conservation
Mission Statement

To preserve, enhance, restore, and conserve Vermont's natural resources, and protect human health, for the benefit of this and future generations.

Vermont Fish & Wildlife Department
Mission Statement

The mission of the Vermont Fish & Wildlife Department is the conservation of all species of fish, wildlife, and plants and their habitats for the people of Vermont. To accomplish this mission, the integrity, diversity, and vitality of their natural systems must be protected.

Vermont Department of Forests, Parks and Recreation
Mission Statement

The mission of the Department of Forests, Parks and Recreation is to practice and encourage high quality stewardship of Vermont's environment by monitoring and maintaining the health, integrity, and diversity of important species, natural communities, and ecological processes; managing forests for sustainable use; providing and promoting opportunities for compatible outdoor recreation; and furnishing related information, education, and services.

EXECUTIVE SUMMARY

The Mt. Philo Long-range Management Plan (LRMP) presents resource summaries, detailed mapping, allocations of land use, and a schedule of management for the state park property. The development of LRMPs for agency lands represents an important framework for providing responsible stewardship for public land. LRMP's are broadly prescriptive documents that set an outline for management into the future, taking a long view over the next 20-25 years. Given the nature of MPSP, such as its rich history, local prominence and intense visitation over a small area, this LRMP also incorporates some short-term considerations that are not typically included in other long-range plans. This document provides the necessary guidance for management that is outlined within annual stewardship plans and park operations.

The 232 -acre Mt. Philo State Park (MPSP) is in the Champlain Valley biophysical region Town of Charlotte. Best known for the Mount Philo summit, Mt. Philo State Park is popular for its spectacular views of the surrounding Champlain Valley, Lake Champlain, and the Adirondack Mountains in the western distance. The steepest slopes are on the western face of the mountain with a band of exposed cliffs that wrap around the south, west and northwest sides of the summit.

Mt. Philo State Park is much loved for its forested setting in the increasingly fragmented Champlain Valley; for its representative forests, plants and wildlife; for its high-quality hiking trails; for its spectacular views; for opportunities to view wildlife and observe nature; and for the opportunity to escape to a natural place. Visitors place high importance on the ecological value, resource protection, wildlife habitat and recreational opportunities afforded by public ownership and value a healthy forest in an increasingly fragmented landscape.

Mt. Philo State Park is a special place - Vermont's first state park - and has filled an important role in regional history. Appropriate interpretation of the natural and historic resources provides the visitor with a greater understanding of MPSP, the natural landscape in Vermont, and an appreciation of a responsible hiking ethic. Careful stewardship supports a healthy forest that provides for a range of high quality recreational activities, especially hiking, supports functioning natural communities and strives for a careful balance and integration of public uses.

Vision Statement

The healthy forests and spectacular views of Mt. Philo State Park provide a valued setting for high quality, well-managed, hiking-focused, recreational experiences that are consistent with the mission of the Department of Forests, Parks& Recreation; are ecologically and physically sustainable; and engender a strong sense of stewardship among visitors. It provides a location where responsible and ethical recreational use does not degrade the natural communities and their associated forests, plants and wildlife; where water and soil resources are protected; and where interpretation of natural and historic resources provides the visitor with a greater understanding and appreciation of Mt Philo State Park and the natural landscape of Vermont.

Legal Considerations

MPSP was acquired in three separate transactions, all three were gifts to the State of Vermont. The original parcel, acquired in 1924 from Frances Humphreys, included language in the deed that reinforced the recreational use of the property by stating that it be used for the "health, recreation and pleasure of the public."

Natural Communities

Ten occurrences of nine natural community types were identified and mapped within MPSP. A total of eleven natural community polygons were mapped including 200 acres of uncommon community types. Some broad patterns emerged from this effort. Much of MPSP is characterized by young forests with oaks, hickories, and white pine. Wetlands are almost entirely absent from the parcel. Because of small size and isolated landscape context, the natural communities found at MPSP are not examples of statewide significance. However, locally within the Champlain Valley, where the majority of the land is either developed or used for agriculture, all of these natural community examples are of very high ecological value. These high-quality examples will be maintained by promoting a natural diversity of native species.

Natural Communities of Mt. Philo State Park

Natural Community		Acres	Vermont Distribution	*Example of Statewide Significance?
Wetlands	Red Maple-Black Ash Seepage Swamp	1	Common	No
	Seep	0.3	Common	No
Uplands	Dry Oak-Hickory-Hophornbeam Forest	28	Uncommon	No
	Limestone Bluff Cedar-Pine Forest	0.5	Rare	No
	Mesic Maple-Ash-Hickory-Oak Forest	159	Uncommon	No
	Mesic Red Oak-Northern Hardwood Forest	4	Common	No
	Temperate Calcareous Cliff	1.7	Uncommon	No
	Temperate Calcareous Outcrop	0.4	Uncommon	No
	Transition Hardwood Limestone Talus Woodland	11.2	Uncommon	No

For more information on these and other natural communities, see Wetland, Woodland, Wildland: a Guide to the Natural Communities of Vermont, by Elizabeth Thompson and Eric Sorenson. Information may also be found online at: http://www.vtfishandwildlife.com/books.cfm?libbase_=Wetland,Woodland,Wildland

**Because of small size and isolated landscape context, the natural communities found at MPSP are not examples of statewide significance. However, locally within the Champlain Valley, where the majority of the land is either developed or used for agriculture, all of these natural community examples are of very high ecological value.*

Wildlife and Habitat

Several important habitats are found within MPSP including meadows, cliff and talus areas, groups of wild apple trees, and a small wetland. The upland forests contain a significant component of hard mast species including oaks and hickories. Forest covers approximately 82% of MPSP in hardwood dominated stands. There are seven rare or very rare plants known to occur within MPSP, as well as an additional five species of uncommon plants. There is potential habitat for five rare bat species and three rare bumblebee species. Habitat for many of these rare species are within the uncommon natural communities found at the state park.

Timber Resource

While timber management is not a high priority for MPSP, timber harvest is a valuable tool for maintaining a healthy, resilient forest of native species adaptable to a changing climate, habitat

for a variety of wildlife species, and as a valued setting for high quality recreation. Lack of suitable access, park infrastructure and presence of invasive species present operational challenges to timber management. The most recent timber harvesting project was a salvage operation that followed the January 1998 ice storm, an ice storm of unusual magnitude that caused extensive damage to forests and property. Damaged, destroyed and dangerous trees were removed from hiking trails, roads, the picnic area and campground. Wildlife management on MPSP will protect and enhance significant and unique habitat by maintaining a mosaic of forests, shrublands and healthy natural communities, promoting native species, and maintaining or enhancing den and cavity trees for nesting and coarse woody material on the forest floor for wildlife habitat, nutrient cycling and soil protection.

Fisheries and Water

The entire parcel is within the Lake Champlain watershed. The majority of the water draining from the parcel eventually reaches Lewis Creek or Kimball Brook, but a small portion of the parcel drains to the LaPlatte River. Overall MPSP is very dry, with only tiny seasonal streams and two minor wetlands. An example of Red Maple-Black Ash Seepage Swamp located in the northeast corner of the property is the only substantial wetland community on the property. Despite its small size, it provides good habitat for amphibians and other species benefiting from moist soils and swamp habitat. There is a small pond as well, which is likely of human origin.

Forest Health – Invasive Exotic Species

One of the biggest and growing threats to forest health as well as a substantial management challenge is the proliferation of invasive plant species. There are a number of terrestrial invasive plants which are having an impact on native species diversity, habitat quality, recreational use, and aesthetics. Particularly well-developed populations of invasive species are found at lower elevations, developed areas, and disturbed forests. While the suite of species is extensive, the most prevalent species include common buckthorn, honeysuckle, oriental bittersweet, Japanese barberry and poison parsnip. Invasive species will be addressed by targeting management on those species that pose the greatest threat to forest or human health and habitat integrity to the extent practical.

Historic Resources

MPSP has a long history of recreational activity. Carriage roads and gazebos lined the route to the summit as early as 1901. Following the acquisition of the parcel as Vermont's first State Park, the Department of Forests, Parks & Recreation and Civilian Conservation Corps undertook a number of recreation-focused development projects including trail, campground and picnic area establishment. Historic resources will continue to be mapped, documented and interpreted as practical and appropriate.

Recreational Users

Mt. Philo State Park is one of the most popular hiking and destination parks in the state. Its location in the Champlain Valley near the largest population centers in Vermont, its natural landscape and the spectacular views from the summit draw many thousands of visitors each year. It is that very popularity that is putting increasing pressure on the resources and facilities of MPSP. Management will focus on maintaining existing hiking trails and recreation facilities, managing increasingly high visitation while protecting the environment, and interpreting the natural setting and historic context within MPSP. Ongoing trail maintenance will continue toward a goal of sustainability and include relocation of trail segments and widening and

hardening trail surfaces as needed. Limited expansion of the hiking trail system is planned to form an alternate route to the summit by designating and designing trails on the Allmon (northern) parcel. Dogs will be required to be on leash at all times and pet owners will be expected to pick up and remove all pet waste.

Infrastructure and Access

Public access to MPSP is limited to the park entrance off Mt. Philo Road (town highway #35). Infrastructure features include park access roads, gated interior roads, parking lots, signs, kiosks, and park buildings, utilities and facilities (i.e. camping and picnic sites, bathrooms) within the developed portions of the state park. Park infrastructure requires regular, and often expensive maintenance to keep it viable and safe as public resources. Project completion is based on available funding allocated based on statewide Parks project prioritization. Parking will be managed at current levels. Parking is considered adequate to optimize both high-quality recreational experience and natural resource protection at MPSP. Expanded parking would translate into visitation out of balance with visitor experience and environmental protection. Measures to ensure that parking use is maximized within the existing parking lot footprint without impact to field habitat or parking on town roads will be undertaken.

Scenic Resources

At 980 feet above sea level, Mt. Philo is a high point in the Champlain Valley and is visible from many points in the local landscape. The summit of Mt. Philo also serves as an important vantage point for views of the surrounding Champlain Valley and Adirondack Mountains in the western distance. These views are an important part of the recreational experience at MPSP. Protection of the scenic resources within the immediate and distant view shed is an important management consideration.

Management Classification

After completion of inventories and assessments the lands, resources, and facilities held by the Vermont Agency of Natural Resources (ANR) are evaluated and assigned to appropriate Agency Land Management Classification categories based upon knowledge and understanding of resources and appropriate levels of management. The four categories as applied to MPSP are Highly Sensitive (2%), Special Management (92%), General Management (2%), and Intensive Management (2%). This enables land managers to allocate use and management by area minimizing conflicts between competing objectives and facilitating a common understanding of the overall use or type of management to occur in particular areas of the MPSP.

Management goals for the MPSP include strategies to:

- Maintain or enhance quality rank of significant natural communities and protect or enhance rare, threatened and endangered species and their habitats.
- Maintain or enhance the parcel's ability to provide ecosystem services such as providing nutrient cycling, protecting soil and water resources, and providing high quality, sustainable recreational opportunities.
- Promote an ethic of respect for the land, sustainable use, and exemplary management.
- Assess, map and prioritize management of invasive species. Control or limit invasive plant populations to extent feasible.

- Provide dispersed recreational opportunities and a high quality, sustainable hiking trail system where appropriate and compatible with other goals.
- Manage visitor use and expectations to ensure high quality experience.
- Document, protect and interpret historic resources as feasible and appropriate.

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LIST OF ABBREVIATIONS

ADA	American's with Disabilities
ANR	Agency of Natural Resources
AOT	Agency of Transportation
ATV	All-Terrain Vehicles
CCC	Civilian Conservation Corps
DWA	Deer Wintering Area
FPR	Department of Forests, Parks & Recreation
FWD	Fish & Wildlife Department
GIS	Geographic Information System
GMP	Green Mountain Power
GPS	Global Positioning System
LARC	Land Acquisition Review Committee
LRMP	Long Range Management Plan
LUC	Land Use Classification
LWCF	Land and Water Conservation Fund
MPSP	Mt. Philo State Park
MSD	Mean Stand Diameter
ROS	Recreation Opportunity Spectrum
ROW	Right-of-way
RTE	Rare, Threatened and Endangered
SGCN	Species of Greatest Conservation Need
SP	State Park
UVM CAP	University of Vermont Consulting Archaeology Program
VAST	Vermont Association of Snow Travelers
VFBMP	Vermont Forest Bird Monitoring Program
VHCB	Vermont Housing and Conservation Board

I. PARCEL DESCRIPTION

A. Parcel Description

The 232-acre Mt. Philo State Park is located in the Champlain Valley town of Charlotte. The state park is just 15 miles south of Burlington near the southern border of Chittenden County and is at the intersection of State Park Road (Town Highway #5) and Mt. Philo Road (Town Highway #35) east of Route 7. The state park is a forested island in a larger matrix of a rural/developed landscape. Best known for its namesake Mount Philo, a summit rising 980 feet above the relatively flat terrain of the surrounding landscape, the state park is famous for its spectacular views of the Champlain Valley and the Adirondack Mountains. The steepest slopes are on the west side of the mountain with a band of exposed cliffs that wrap around the south, west, and northwest sides of the summit.

B. Purposes of State Land Ownership

State Parks are managed by the Vermont Department of Forests, Parks and Recreation to meet a variety of conservation and management goals.

Vermont State Parks Mission

…to conserve and interpret on behalf of the people of Vermont, their natural, cultural, historic, and scenic heritage, and while doing so to provide appropriate recreational opportunities and economic benefit…. The emphasis in this dual role should be provided only within the ability of the natural and cultural resources to support the activity.

Use and Management of Mt. Philo State Park is designed to:

- Conserve biological diversity on the parcel and contribute to the diversity of the larger landscape;
- Maintain and enhance forest ecosystem health;
- Maintain and enhance the parcel's ability to provide ecosystem services such as providing wood products, protecting soil and water resources, and providing recreational opportunities;
- Promote an ethic of respect for the land, sustainable use, and exemplary management;
- Conform to any and all deed restrictions, conservation easements, and legal agreements;
- Protect and improve the condition and resiliency of important biological and natural resources;
- Maintain or enhance quality rank of significant natural communities and protect habitat of rare, threatened, and endangered species;
- Control or limit invasive plant populations to the extent feasible;
- Document, interpret, and protect historic resources as feasible and appropriate;
- Provide dispersed recreational opportunities and a high-quality trail system at sustainable visitation levels where appropriate and compatible with other goals; and

- Provide safe and enjoyable access for public uses while protecting the resource and forest access infrastructure.

C. History of Acquisition

Present day Mt. Philo State Park was acquired as three separate parcels each gifted to the State of Vermont over a period of 86 years. In 1924, Frances Humphreys of Brookline, Massachusetts, deeded 149 acres to the State of Vermont. It became known as Mt. Philo State Forest Park, the first in the state. It was her desire that the property be used as a public park for health, recreation, and pleasure.

Nearly 45 years later, John and Hobart Wells, of Springfield, Massachusetts and Addison, Vermont, respectively, deeded 13 acres to the state to be added to the southeast side Mt. Philo State Park. And most recently, in 2010, lands to the north, including the northern slope of Mt. Philo were added in a gift of 69 acres from Charles and Gwen Allmon of Potomac, Maryland, making the total state park ownership 232 acres.

Accounts from the 1800s attribute the name of the mountain to a famous hunter by the name of Philo. References to the Native American name for Mount Philo include *madegwasepskak* - at rabbit mountain or *matequasaden* - rabbit mountain.

D. Land Use History

The Mt. Philo area has a long and varied history. As a high point in the landscape it likely played a role in native American culture as a significant pilgrimage site. It also played a role in early agriculture particularly as part of the 19th century Smith Jones farm. Most recently, Mt. Philo has figured prominently in the early recreational use in the Champlain Valley. A narrow carriage road was built to the summit in 1901. Beginning as early as the late 1800s and early 1900s, Mt. Philo experienced an increasing popularity among recreationalists hiking or riding carriages to the summit for picnics and views. Later, during the 1930's, under state ownership the state park saw recreation development from the Civilian Conservation Corps under the guidance of the Vermont Forest Service (now the Vermont Department of Forests, Parks & Recreation).

E. Natural Resource Highlights

Mt. Philo State Park is home to nine natural community types, most of which are uncommon in Vermont. In the context of the Champlain Valley, where development and agricultural use dominate, these natural communities have very high ecological value. The property is characterized by young forests with oaks, hickories, and northern hardwood species. There are pockets of white pine and other softwood species (i.e. Norway spruce, tamarack, red pine) throughout. Only remnants remain of these 1930s Civilian Conservation Corps plantings. Many were destroyed during the 1998 ice storm that struck much of Vermont and surrounding states. Rare plants and animals at MPSP include seven rare or very plants and habitat for four rare bats and three rare bumblebees. Site conditions at Mt. Philo are relatively dry with just a few small wetland communities and intermittent streams that only run water during spring snowmelt or rainy periods. Water availability for park facilities has been an issue over the years with wells often running dry during the summer or extended dry periods. Recent well development was underway in 2017 to address some of the water supply issues. Mt. Philo State Park receives some

of the highest visitation in the state, more so than Camel's Hump and other popular recreation hotspots. High visitor use continues to put pressure on those facilities and water resources. Recreational use figures prominently in the management of Mt. Philo. The forested slopes serve as an important setting for those activities. MPSP is very popular for day use and hiking and is one of the most heavily used state parks in Vermont. That high use contributes to resource impacts and management challenges that shape the decision-making at the foundation of the long-range management planning process.

F. Recreation Highlights

Mt. Philo State Park is most popular as a day-use destination for hiking and picnicking. The park receives some of the highest visitation in the state. During 2015, over 51,000 people visited the park during operating hours. And, in a 15-month period in 2016 and 2016, over 108,000 hikers were counted along the House Rock and Campground trails. While impressive, those numbers do not include visitors hiking the road during the off-hours/season or along other trails. The park also hosts a 10-site camping area that receives modest use. The shelter at the summit is popular for events. Most of the developed facilities within the park were built by the Civilian Conservation Corps in the 1930s.

Recreational use figures prominently in the management of MPSP. The forested slopes serve as an important setting for those activities. The Park is very popular for day use and hiking contributing to resource impacts and management challenges that shape decision-making at the foundation of the long-range management planning process.

G. Relationship to Town, Regional, and Other Pertinent Planning Efforts

Regional Plan

Planning and management on MPSP are compatible and complementary to natural resource goals of the Chittenden County Regional Plan (2013; amended 2016).

Applicable goals, strategies and recommendations from the regional plan:

- Emphasize the importance of the natural landscape with a stated goal of strategically planned and managed green infrastructure network composed of natural areas, working lands (forestry, agriculture), wildlife habitat and scenic views.
- Support the protection of forests and wetlands from development to maintain soil, air and water quality and native species and natural habitats.
- Stress the importance of the conservation of ecosystem values and functions and the associated benefits provided to communities including healthy landscapes that support habitat, outdoor recreation opportunities.
- Emphasize the protection of forests and wetlands from development in order to maintain natural habitats.
- Recognize the need for climate adaptation with a stated goal of maintaining vegetated landscapes to support carbon sequestration, protection and conservation of forests, wetlands and agricultural lands.

Town Plan
Planning and management on MPSP are compatible and complementary to natural resource goals of the Charlotte Town Plan (March 2016).

Applicable goals, strategies and recommendations from the Charlotte Town Plan:

- Maintain and conserve contiguous forest habitat; seeking ways to expand large patches of contiguous forests to protect corridors and linkages.
- Manage invasive species and emphasize the importance of native species.
- Encourage long-term stewardship of habitat and natural communities that support rare, threatened and endangered species.
- Recognize the importance of forested lands for their role in providing wood products, aquifer recharge, wildlife habitat, erosion control, riparian habitat, nature study and aesthetics.
- Encourage development of forest management plans that address ecological functions while providing for sustainable harvesting.
- Emphasize the importance of access and siting of outdoor recreation facilities, including trails, to complement and incorporate natural settings and to minimize adverse environmental and ecological impacts.

Figure 1: Locator and Biophysical Region Map

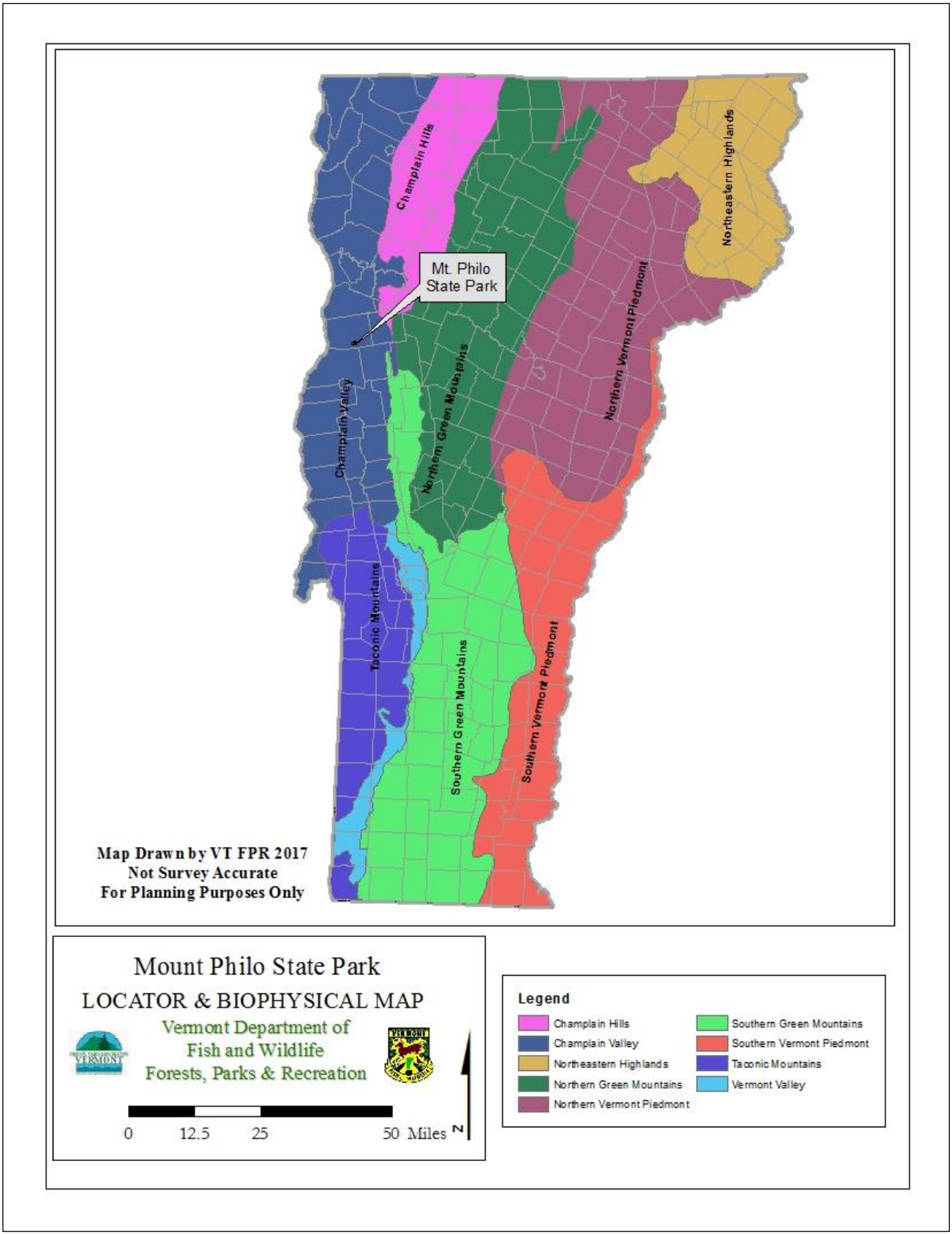
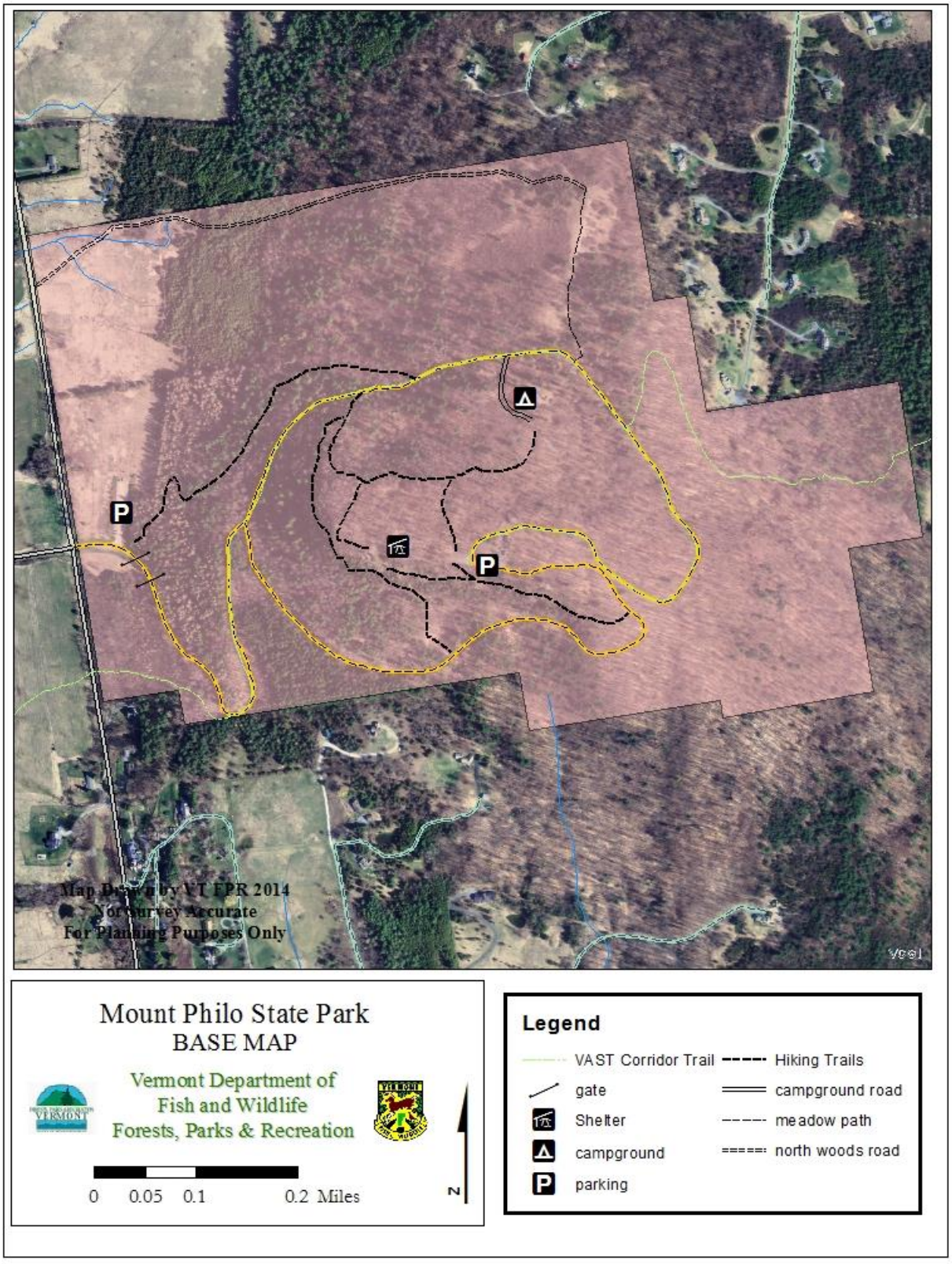


Figure 2: Parcel Base Map



II. PUBLIC INPUT

The citizen participation process for Mt. Philo State Park Long Range Management Plan was conducted in accordance with Agency of Natural Resources policies, procedures, and guidelines. Public involvement or citizen participation is a broad term for a variety of methods through which the public has input into public land management decisions. The Agency of Natural Resources, including the Departments of Forests, Parks and Recreation and Fish & Wildlife, with assistance from staff in the Department of Environmental Conservation is committed to a planning process which offers the opportunity for all citizens and stakeholders to participate. These include letters, surveys, personal comments, telephone calls, e-mails, and more formal methods such as public meetings and workshops. All public input received concerning the future stewardship of Mt. Philo State Park has been considered in the preparation of this plan.

An open-house style informational public scoping meeting was held on June 17, 2013 at the Charlotte Town office in Charlotte, Vermont to present inventory and assessment information and to receive comments at the start of the planning process.

A 2014 internet survey (using Survey Monkey) was posted on the Department website, sent to stakeholders and advertised with local and state media. This method was used to gather additional recreation-related and management input.

In June 2016 a public meeting was held at Kingsland Bay State Park that focused on recreation-related uses and management issues at Mt. Philo SP. A productive, facilitated table discussion generated many comments related to those topics.

The draft long-range management plan was presented to the public on April 19, 2018. A 45-day comment period followed. The meeting format was on open house where participants had the opportunity to review the draft plan, view maps, discuss goals and strategies with agency staff and provide written comments.

A summary of the comments received during the public involvement process, a summary of the Department's response to comments, and additional information about the public involvement process are in Appendix 4.

III. RESOURCE ANALYSIS

A. Legal Constraints Assessment

Legal constraints that affect the stewardship of Mt. Philo State Park include:

Deed Restrictions or Obligations

- 149.4 acres gifted to the State of Vermont by Frances Humphreys – *"…to be held, owned and used…for a public park or public reservation for the health, recreation, and pleasure of the public under such reasonable plans, rules and regulations as said State of Vermont….may make, publish, and prescribe, and this conveyance is made on the express condition that…in case the land shall not be so held, owned, or used, or shall be used for any purposed inconsistent therewith, said land shall revert to the grantor or her heirs and assigns."*
- 13.45 acres gifted to the State of Vermont by John and Hobart Wells – no encumbrances
- 69 acres gifted to the State of Vermont by Charles and Gwen Allmon – no encumbrances

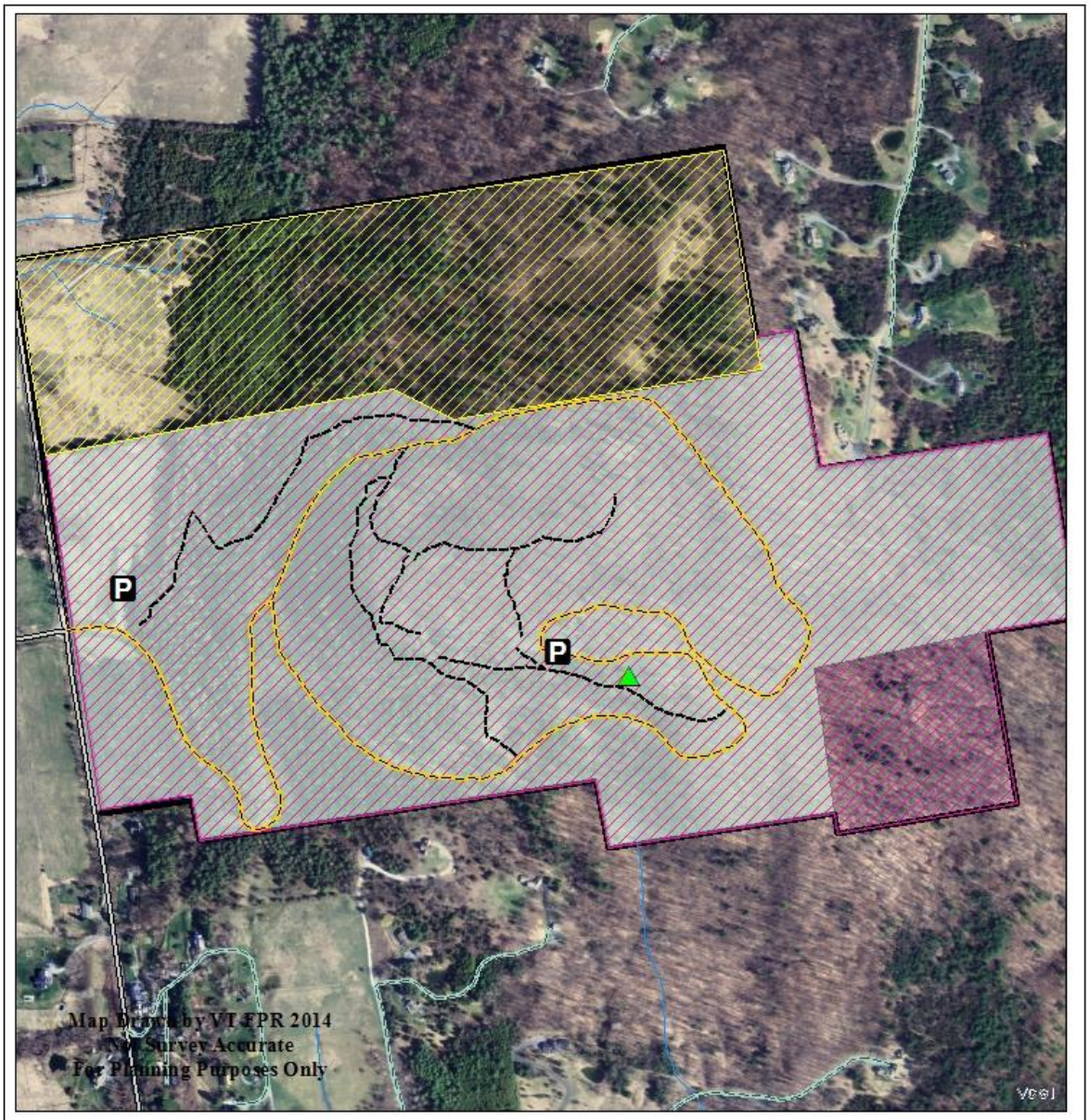
Funding Restrictions:

- Project funding for Mt. Philo State Park has utilized Land and Water Conservation Fund (LWCF) funds. This funding source encumbered all of the lands of the state park ownership in 2004. This did not include the Allmon property which was not conserved until 2010. In 2018, that designation was expanded to include the Allmon property as LWCF project funding was used for hiking trail upgrades. LWCF funds are used to conserve properties with important outdoor recreation value. Public access for recreational purposes is to be preserved in perpetuity. On these properties, management for other purposes (forest products, wildlife, etc.) is permitted as long as it does not permanently impact the recreational value of the property.

Long-term Leases and Licenses

- Electronics Communication Site: located 100 yards southwest of the summit parking lot, the site consists of an electronics building and tower on 0.25 acres. The site is owned in fee by the State of Vermont (Department of Forests, Parks & Recreation) and licensed to Vermont Railway, Charlotte Volunteer Fire Department and Ferrisburgh Volunteer Fire Department, Inc. Antennas and electronic equipment are co-located at this site. All installation is coordinated with the Vermont Department of Public Safety.

Figure 3: Legal Constraints Map



B. Ecological Assessment of Natural Communities, Plants, and Wildlife

The Agency of Natural Resources uses a "coarse filter/ fine filter" approach to the ecological inventory and assessment of state lands (Jenkins 1985; Noss 1987; Hunter et al. 1988; Hunter 1991; Noss and Cooperrider 1994; Haufler et al. 1996; Jenkins 1996; Poiani et al. 2000). Widely employed as a management tool on state, federal, and private lands (see for example: Leslie et al. 1996; Committee of Scientists 1999; Stein et al. 2000; USFS 2000, 2004), it is an aid to land managers who seek to protect most or all of the species that naturally occur on their lands, but who lack the resources to make exhaustive inventories of all taxonomic groups. Because many groups of organisms are cryptic or poorly understood (for example, fungi and soil invertebrates), it is not practical to make lists of all of them (Anderson et al. 1999; Willis and Whittaker 2002). Even if we could assemble such lists of species, it would be impossible to manage the land with all of them in mind. Instead, natural communities are treated as a proxy for the biological organisms of which they are composed. It is thought that if examples of all of Vermont's natural communities are conserved at the scale at which they naturally occur, most of the species they contain, from the largest trees and mammals to the smallest insects, will also be conserved (NCASI 2004). Natural communities are thus a coarse filter for "catching" the majority of an area's native organisms. Because conservation of habitats (in the form of natural communities) will not protect all species, we also employ a "fine filter" to catch the remaining species that are known to require very specific conditions for their growth, reproduction, wintering, etc. Examples of organisms benefiting from the fine filter inventories described below include breeding birds, deer on their wintering areas, and rare plants.

Natural Community Summary

Much of Mt. Philo State Park (MPSP) is characterized by young forests with oaks, hickories, and white pine. Cliffs and outcrops provide important habitats for several rare and uncommon plants species, as well as more common species of birds, mammals, and reptiles. Wetlands are almost entirely absent from the parcel. Because of small size and isolated landscape context, the natural communities found at MPSP are not examples of statewide significance. However, locally within the Champlain Valley, where the majority of the land is either developed or used for agriculture, all of these natural community examples are of very high ecological value.

Wildlife Summary

Wildlife species known from MPSP reflect the habitats summarized above and discussed in detail below. The most common species on MPSP are species that rely on forests for some or all of their needs (e.g. rabbits, squirrels, fox, deer, songbirds). Opportunities for wildlife viewing are limited at MPSP, although observing the annual fall hawk migration through the Champlain Valley and bird watching in the meadow are popular. Occasional squirrels, chipmunks and rabbits may be spotted. Deer tracks can be seen in winter. Foxes and bobcats pass through the forests and fields of Mt. Philo State Park but sightings are relatively rare and few other species are observed. Herbaceous plant and shrub-dominated fields provide important habitat for rare bumblebees, songbirds and foraging bats. It is likely that the high recreational use including the presence of dogs has an impact on wildlife. The following are summaries of wildlife known from MPSP organized by major species groups. See the following sections for more details on listed species.

Birds

MPSP provides habitat for a variety of bird species. E-bird Vermont (www.ebirdvt), a joint project of the National Audubon Society and Cornell Lab of Ornithology reports 125 species for Mt. Philo State Park over the past several years. The Vermont Audubon Champlain Valley Priority Bird List lists 8 species that might be found within meadow/shrubland habitat on MPSP. The value of this habitat is the mix of shrubs and forbs and represents an important habitat to maintain on the landscape. The meadow/shrubland habitat at the base of the mountain, with its herbaceous plant cover mixed with islands of shrubs and hedgerows provides important habitat for songbirds (i.e. brown thrasher) as well as mammals, reptiles and pollinators. The state park is perhaps best known for its vantage point for the Champlain Valley's annual hawk migration. Red-tailed, broad-winged, coopers, red-shouldered and rough-legged hawks, turkey vultures, and bald and golden eagles have been seen during these migration events.

Mammals

Small mammals (i.e. chipmunks, squirrels) as well as fox and occasional deer can be seen within MPSP, especially in less developed areas of the park. Both hard (i.e. oaks, hickories) and soft (i.e. apple) mast trees provide food for wildlife. Hardwood forests, softwood dominated areas (northern white cedar) and shrub-dominated fields provide a diversity of habitat. High visitor use at MPSP may be having a significant impact on wildlife, especially those species that are sensitive to the near-constant presence of people and dogs.

There are nine species of bats in Vermont. Five of them (eastern small-footed, little brown, northern long-eared, Tri-colored and Indiana) are listed as "endangered" or "threatened" under Vermont endangered species statute (10 V.S.A. 123). The northern long-eared bat and Indiana bat are also federally listed. Vermont's bats fall into two groups, those that winter in caves and those that migrate to the southeastern United States to over winter. In summer, both groups forage in Vermont's hardwood forests. Forest management that maintains a matrix of forest, openings, corridors to water sources, and an adequate supply of roost tree candidates (dead or dying with signs of cracks, crevices, loose bark or cavities) provide ideal habitat. The summer range for Indiana bat in Vermont is limited to the Champlain Valley. Indiana bats forage within forests, along forest edges and hedgerows, and near or along open water and wetlands.

Bat surveys have not been conducted on MPSP, however habitat within the state park provide roost trees and terrain suitable for a variety of bat species that have been documented as widespread throughout the state.

White-nose syndrome has decimated bat populations in the eastern United States. Some estimates have Vermont's bat population at just 2-5% of what it was a few years ago. While it is not certain how many bats use the forests of MPSP, it is certain that their preferred habitat exists in that location. An evaluation of habitat conditions and presence of bats (including acoustic surveys) should be conducted prior to forest management.

Reptiles and Amphibians

MPSP is a relatively dry location with few wetlands and streams. Where those exist amphibians and reptiles find habitat. The field and small wetland at the base of the mountain provides habitat

for snakes as do the cliffs at the interior of the property. DeKay's brown, common garter, red-bellied, and ring-necked snakes have been observed at MPSP during surveys.

Invertebrates

Extensive surveys to better understand the invertebrate populations at MPSP have not been done. However, the shrub-dominated field at the base of the mountain and the open area at the northern summit contain suitable habitat for several species of bumblebee listed as "endangered" or "threatened" under Vermont endangered species statute (10 V.S.A. 123). These include the rusty-patched, Ashton Cuckoo and Yellow-banded bumblebee. The yellow-banded bumblebee is also federally listed. Managing that habitat for bumblebees and other pollinators would help to conserve those species.

Coarse-filter/Broad-scale Habitat

The coarse filter assessment begins by describing landscape and climatic factors that categorize MPSP, such as bedrock geology and water resources. It then details the nine distinct natural community types documented and mapped during inventories of the state park. This is followed by a fine filter assessment describing rare species and wildlife habitats found here.

Biophysical Region and Climate

Vermont's landscape is divided into eight regions that share similar features of climate, topography, geology, human history, and natural communities. MPSP is located in the Champlain Valley biophysical region, which is found along Lake Champlain, stretching from the Canadian border south to the town of West Haven. The Champlain Valley is the warmest and driest part of Vermont, and physiologically it has more in common with the Saint Lawrence Valley and the Great Lakes region than the Green Mountains or the Adirondacks that border it. The terrain is generally flat near the lake, with gently sloping foothills leading up to the Green Mountains. The bedrock is generally calcareous metamorphic rock, but often the bedrock is buried by deep post-glacial sediment accumulations. The Champlain Valley has a long history of agricultural use that continues into the present day; much of the land in the region is actively farmed. Forested remnants, such as the patch on Mount Philo, are typically small and isolated.

Bedrock Geology, Surficial Geology, and Soils

The geologic history of an area can have a strong influence on the distribution of species and natural communities. Mount Philo has an interesting geologic history that has been well-documented (see for example Gale and Anderson 1998). The parcel is located on the Champlain Thrust Fault, which pushed older rock of the Monkton quartzite formation over the younger Stony Point shale. Thus, the rocks at the top of the mountain are older than those at the base. Both rock formations are nutrient-rich and can contribute to soil enrichment. In addition, the exposed rock outcrops and cliffs can support a diverse selection of plants, many of which are rare in the state. The degree to which bedrock affects growing conditions at MPSP is also mediated by the depth of the surficial materials deposited at the end of the last continental glaciation, some 15,000-12,000 years ago. As the glacier ice melted, rock fragments of all sizes, from boulders to clay, fell in an unsorted jumble known as glacial till. At the same time, the Champlain Valley was flooded first with a freshwater glacial lake, and then by ocean water that extended up the Saint Lawrence Valley. Water levels reached as high as a present-day elevation of 600 feet, leaving the summit of Philo exposed as an isolated island (Wright 2009). Within

these water bodies, silts and clays settled out to form a thick layer which buried the till in places, and as the water lowered to its present level, these silts and clays were exposed. Today, the lower elevations of MPSP have silt and clay-derived soils while the higher elevations have till-derived soils. The soils mapped by the NRCS in the park include the till-derived Farmington, Georgia, Massena, and Stockbridge/Nellis series, as well as Vergennes series in the lowest elevations in the open fields. Finally, the very small wetlands on the property have post-glacial accumulations of peat and muck.

Hydrology

MPSP receives around 34" of precipitation annually, which is drier than average compared to the entire state (some places in the Green Mountains can receive up to 70" of precipitation in a year). The entire parcel is within the Lake Champlain watershed. The majority of the water draining from the parcel eventually reaches Lewis Creek or Kimball Brook, but a small portion of the parcel drains to the La Platte River. Overall the park is very dry, with only tiny seasonal streams and two minor wetlands on the property. There is a small pond as well, which is likely of human origin.

Natural and Human Disturbance

Natural disturbance processes, such as wind, fire, and flooding, continually shape landscapes and define their natural communities. The most frequent upland natural disturbances at MPSP are small-scale, ongoing events, resulting in individual tree death and canopy gap dynamics. Moderate scale disturbances such as blowdowns, ice storms, and insect defoliation events are expected less frequently, but have the potential for larger impacts. Very large-scale disturbances (events affecting many hundreds of acres or more) are expected to occur rarely, but if an event does occur it would have the potential to create dramatic changes in natural communities.
Land use history also influences the present-day distribution of natural communities at Mount Philo SP. Like much of the Vermont landscape, especially in the Champlain Valley, the parcel has a history of agriculture, timber harvesting and recreational use. Evidence of these activities can still be found in the relatively young forests of the property and the presence of non-native, invasive species. The legacy of human land use will continue to affect the natural communities for a long time.

Landscape-scale Land Use and Connectivity

Forest Blocks and Interior Forest

Located in the Champlain Valley, Mt. Philo State Park is a relatively small forest "island" surrounded by agricultural fields and human development. The park is almost entirely within an approximately 444-acre forested habitat block. While this block extends beyond the park, it is still bounded by Mt. Philo Road, Spear Street, Guinea Road and One Mile Road. Very little of this block is remote enough to function as high-quality interior forest. However, in the context of the Champlain Valley, even small, isolated habitat blocks can be an important refuge for some wildlife species, such as some songbirds, bobcat, raptors, reptiles and salamanders.

Wildlife Movement Corridors

Connections between wild lands can serve an important role in maintaining long-term health and viability of wildlife populations. Wildlife corridors not only allow individual animals (such as

young individuals searching for new habitat) to move throughout the landscape, but also allow for the transfer of genetic information across the region. Even the occasional travel of a few individual animals between otherwise isolated populations can substantially increase their long-term viability, because the genetic diversity within each group is effectively increased. MPSP does not contribute to regional landscape connectivity; however, the parcel probably does contribute to local wildlife movements. Aside from serving as a habitat island (see above section) it is part of a mosaic of the small habitat blocks and brushy riparian corridors that are critical to wildlife movement in the Champlain Valley. MPSP is also close to a relatively intact forested corridor along Lewis Creek, providing an opportunity for some species such as bobcats and salamanders to move between riparian and upland habitats.

In addition, the vistas available at MPSP have provided excellent sites for annual migratory hawk watchers over the years.

Natural Communities

A natural community is an assemblage of biological organisms, their physical environment (e.g. geology, hydrology, climate, natural disturbance regime, etc.), and the interactions between them (Thompson and Sorenson 2000). More than a simple collection of species, a natural community is characterized by complex webs of mutualism, predation, and other forms of interaction. The 89 natural community types described in Vermont repeat across the landscape in patches (or "polygons") of various sizes. These patches (or groups of patches in close proximity to each other) are referred to as natural community occurrences and are to be distinguished from broad descriptions of community types. Natural community occurrences vary greatly in their size. Matrix communities, such as Northern Hardwood Forests, occur in broad expanses across the landscape, and form the context in which other, smaller communities are found. Large patch communities, such as Spruce-Fir-Tamarack Swamp, typically occur at scales of 50-1000 acres. Small patch communities such as Seeps or Boreal Outcrops are usually less than 50 acres in size; many are smaller and owe their existence to highly localized site and disturbance characteristics. Natural communities at Mount Philo State Park were identified through aerial photograph interpretation and field surveys. A Geographic Information System (G.I.S.) map of natural communities was produced using ArcView software from ESRI, Inc. Because some natural communities occur at very small scales (e.g., less than ¼ acre), this mapping effort is probably incomplete. Natural community mapping is an iterative process, and our knowledge improves with each mapping effort. Thus, the map presented here should not be viewed as a final statement on community distribution at MPSP; instead, it should be treated as a first attempt at describing natural communities in this area. Land managers and members of the public should be aware that additional examples of small patch natural communities may occur on the management unit. As subsequent inventories and site visits are conducted, this map will be improved.

Natural community occurrences are assigned a quality rank, a statement of their overall ecological value which helps guide management. An "A"-ranked occurrence is of high quality relative to others of its type in the state, while a D-ranked example is of comparatively low quality. Quality ranks are objectively assigned on the basis of three factors: occurrence size, current condition, and landscape context. The three factors vary in the degree to which they influence overall quality in different communities. For example, size and landscape quality are

more important factors than current condition in the quality ranking of Northern Hardwood Forests, while current condition and landscape context receive greater attention in the ranking of Rich Northern Hardwood Forests. It is important to recognize that assignment of low quality ranks may be due to small size rather than poor current condition. When community occurrences are either rare or of high quality (or a combination of these factors), they may be designated as being of "statewide significance". This designation is applied according to objective guidelines established by the Vermont Department of Fish and Wildlife and which are available upon request. It is recommended that state-significant natural communities be afforded a higher level of protection than other areas of the management unit.

Ten occurrences of nine natural community types were identified and mapped in MPSP (see table below). A total of eleven natural community polygons were mapped. Some broad patterns emerged from this mapping effort. Much of MPSP is characterized by young forests with oaks, hickories, and white pine. These forest species produce a variety of nuts called hard mast, which are then sought by a variety of wildlife, especially chipmunks and squirrels, turkeys, small mammals, jays, grouse and deer. Cliffs and outcrops provide important habitats for a number of rare and uncommon plants species, as well as more common species of birds, mammals, and reptiles including the DeKay's brown snake. Wetlands are almost entirely absent on the parcel, although a small pond exists near the northern boundary. Because of small size and isolated landscape context, the natural communities found at MPSP are not examples of statewide significance. However, locally within the Champlain Valley, where the majority of the land is either developed or used for agriculture, all of these natural community examples are of very high ecological value.

The topography, soils, vegetation, and wildlife associations of each natural community in MPSP are described below.

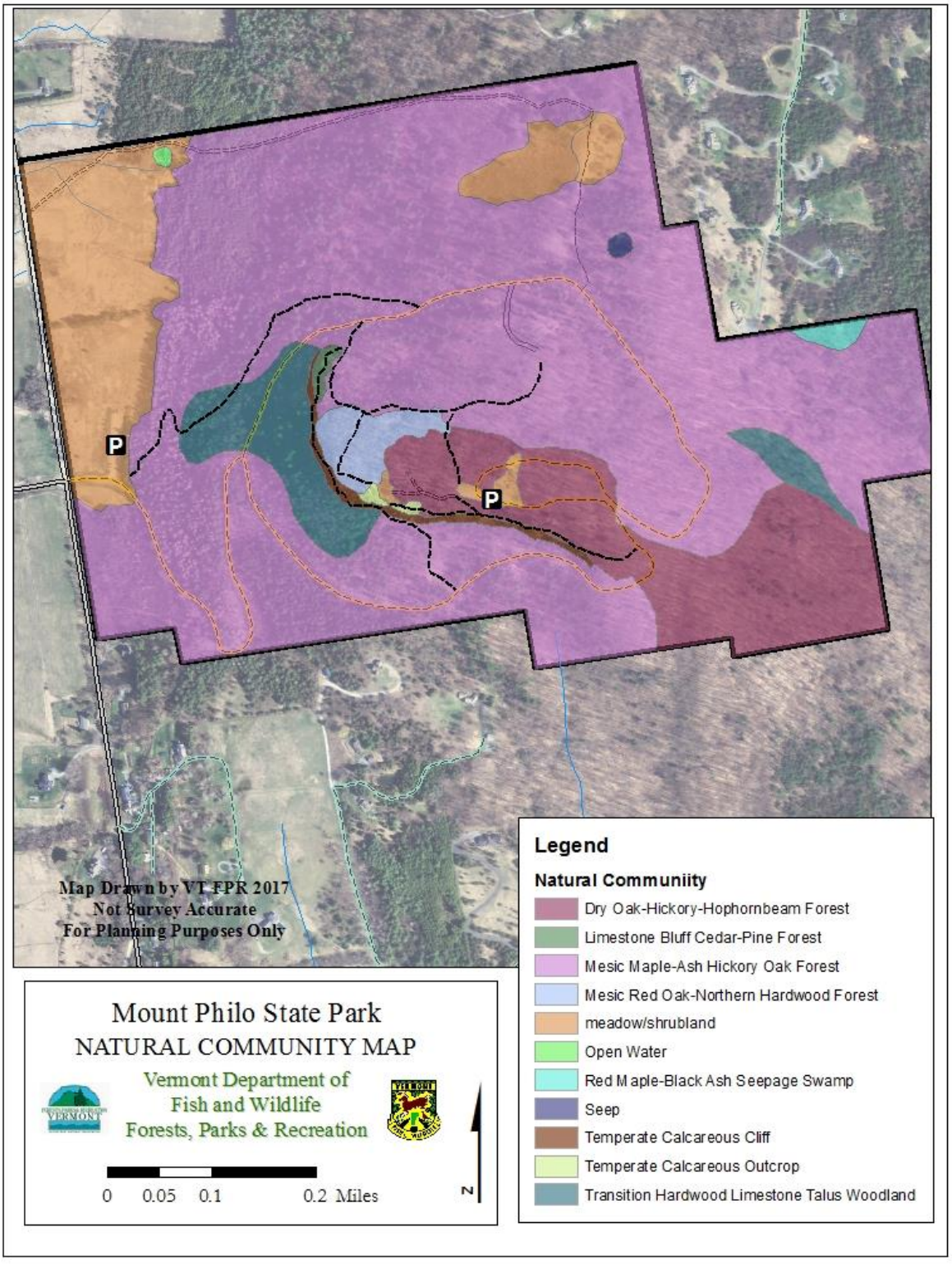
Table 1: Natural Communities of Mt. Philo State Park

Natural Communities of Mt. Philo State Park				
Natural Community		**Acres**	**Vermont Distribution**	***Example of Statewide Significance?**
Wetlands	Red Maple-Black Ash Seepage Swamp	1	Common	No
	Seep	0.3	Common	No
Uplands	Dry Oak-Hickory-Hophornbeam Forest	28	Uncommon	No
	Limestone Bluff Cedar-Pine Forest	0.5	Rare	No
	Mesic Maple-Ash-Hickory-Oak Forest	159	Uncommon	No
	Mesic Red Oak-Northern Hardwood Forest	4	Common	No
	Temperate Calcareous Cliff	1.7	Uncommon	No
	Temperate Calcareous Outcrop	0.4	Uncommon	No
	Transition Hardwood Limestone Talus Woodland	11.2	Uncommon	No
For more information on these and other natural communities, see Wetland, Woodland, Wildland: a Guide to the Natural Communities of Vermont, by Elizabeth Thompson and Eric Sorenson. Information may also be found online at: http://www.vtfishandwildlife.com/books.cfm?libbase_=Wetland,Woodland,Wildland				

**Because of small size and isolated landscape context, the natural communities found at MPSP are not examples of statewide significance. However, locally within the Champlain Valley, where the majority of the land is either developed or used for agriculture, all of these natural community examples are of very high ecological value.*

Descriptions of individual natural community types and related wildlife occurrences are described in Appendix A: Natural Community Descriptions.

Figure 4: Natural Community Map



Meso-filter / Special Habitats

Structural Diversity

Forest covers about 82% of MPSP in hardwood dominated, even-aged stands with little age/size diversity. Inclusions of northern white cedar and white pine add diversity. Many forested areas are degraded with invasive species, particularly associated with disturbed areas. Occasional canopy gaps, large legacy trees, snags, and downed large wood are important structural features and can be found in the forest but are likely much less abundant than they would be in mature, late-successional forests influenced by natural disturbances. Many of these gaps and related features are associated with the 1998 ice storm (see Forest Health Assessment).

Early Successional / Young Forest Habitat
Late Successional / Old Forest

Most of the forest at MPSP are relatively young but none younger than 15 years.
There are no known late-successional forest (>150 years old) or old forest conditions present.

Managed Openings

Herbaceous and shrub communities are important wildlife habitats for many species, including deer, snowshoe hare and dozens of birds. Many species that rely on this habitat are declining, locally in the Champlain Valley and across Vermont but also on a regional and even national level, largely due to loss of habitat. These communities are ephemeral in nature, as they develop into forest without repeated disturbance. MPSP contains 27 acres of small field/shrub openings providing important fruiting/flowering herbaceous and shrub habitat for insectivorous pollinators including state-listed bumblebees, as well as for snakes, birds and small mammals. Poison parsnip and other invasive species degrade this habitat and reduce its suitability for native species.

Ledges and Cliffs

The ledges associated with the cliff band on the west side of the summit have the potential to provide habitat for several species of wildlife including porcupines and small mammals. The high visitation (people and dogs) likely create enough disturbance so that the habitat is not desirable for larger species such as bobcats and fishers.

Deer Wintering Areas

Deer wintering areas provide critical habitat where deer can survive harsh winter conditions. They tend to be at lower elevations and have dense softwood canopies or are hardwood stands with southern exposure. These conditions help reduce ground-level snow depths and minimize wind-chill effects. An ample supply of food, typically in the form of hardwood shoot growth, in proximity to the cover must also be available.

A softwood stand dominated by northern white cedar is located at the northern boundary of the property. While this stand contributes to habitat diversity of MPSP, including habitat for white-tailed deer, it does not function as critical winter cover. Evaluation of the site showed no evidence of current or recent wintering use. Characteristics that support that determination include lack of browse line (cedar is preferred winter food for deer, and heavy deer use would create a line at the limit of a deer's reach), lack of evidence of deer bedding down within the

stand, and lack of evidence of scat. In addition, there is cedar regeneration in parts of the stand, indicating a lack of deer browsing.

The Champlain Valley doesn't consistently receive a lot of heavy snow events so deer do not concentrate in deer wintering areas as regularly as they do in other parts of Vermont. The use of small, isolated areas of softwood cover is limited and often ephemeral. In addition, wildlife, especially wintering deer, are sensitive to the near-constant presence of hikers and dogs, which may be a factor in lack of use at this site.

Dead and Dying Wood Features / Forest Structure Components
Standing dead and dying trees and downed dead trees are vital components of the forest that provide habitat for wildlife ranging from mammals to invertebrates and play an important role in nutrient cycling, soil protection and water availability; all elements of a healthy, resilient forest. Overall, about one-third of New England's forest wildlife makes use of dead and dying wood features, including cavity trees, snags, downed wood, and large trees. These include cavity nesting birds, small mammals such as mice, chipmunks and squirrels, salamander species, raptors, bats, reptiles and beetles. Often these are critical elements, affecting the distribution, behavior, and survival of wildlife. Variation in species, size and condition best accommodate the full range of wildlife needs.

Fine-filter / Special Species

Fine Filter Plants
Seven species of rare or very rare plants are known to occur within MPSP, as well as an additional five species of uncommon plants. Of the rare/very rare species, one is listed as "endangered" and another is listed as "threatened" by Vermont State endangered species statute (10 V.S.A. 123). Their occurrence in MPSP is thus very important on a statewide basis. One of the rare and uncommon plants is sensitive to human disturbance and therefore not listed in this report. Land managers are aware of this species and its management considerations.

Mount Philo has a rich history of botanical exploration, with plant inventory records dating back into the 19th century. In addition to the twelve species in Table 2 below, there are historical records for another ten very rare, rare, and uncommon species that have been observed on Mt. Philo. Two of these species are state-listed as "threatened" and one is state-listed as "endangered". The most recent of these records is from 1929. While there have been many land use changes and disturbances since the early 20th century, it is possible that some or even all of these plants are still present and could be rediscovered within MPSP. Therefore, additional inventories for rare species should be a high priority, especially at sites with proposed management activities.

Many of the rare and uncommon plants at MPSP are associated with cliff and outcrop habitats and are subject to negative impacts from visitor trampling and rock scrambling and climbing. A few additional plants are found immediately along hiking trails and are also at risk of accidental negative impacts. Ongoing monitoring combined with park signage, outreach, and careful guidance of foot traffic, are all necessary to maintain the long-term viability of these plant populations. A few rare and uncommon plant species occur in forested habitats. Maintaining

closed canopy cover and preventing direct disturbance are the best strategies for protecting these populations.

Table 2: Rare, Threatened, and Endangered Plants of Mt. Philo State Park

Rare, Threatened, and Endangered Plants of Mount Philo State Park						
	Species Name	**Common Name**	**Sites Where Found[1]**	**State Rarity Rank[2]**	**Rarity[2]**	**Legal Status**
SPECIES KNOWN TO BE PRESENT FROM RECENT RECORDS	*Hackelia deflexa spp. americana*	Nodding Stickseed	Outcrops, cliffs	S2	Rare	Threatened
	Muhlenbergia sobolifera	Rock Muhly	Woods below cliffs	S2	Rare	
	Phegopteris hexagonoptera	Broad Beech Fern	Forests	S2	Rare	
	Polygonum douglasii	Douglas's Knotweed	Outcrops	S2	Rare	Endangered
	Scutellaria parvula var. parvula	Small Skullcap	Outcrops	S2	Rare	
	Draba arabisans	Rock Whitlow-Mustard	Outcrops, cliffs	S2S3	Rare/Uncommon	
	Hieracium venosum	Rattlesnake Hawkweed	Outcrops	S2S3	Rare/Uncommon	
	Diplazium pycnocarpon	Narrow-leaved Glade Fern	Rich woods	S3	Uncommon	
	Drymocallis arguta	Tall Wood-Beauty	Outcrops	S3	Uncommon	
	Scrophularia lanceolata	Lance-Leaved Figwort	Open woods	S3	Uncommon	
	Selaginella rupestris	Ledge Spikemoss	Outcrops	S3	Uncommon	
	Symphoricarpos albus	Common Snowberry	Dry woods and outcrops	S3	Uncommon	
SPECIES KNOWN ONLY FROM HISTORICAL RECORDS, MAY BE PRESENT	*Juncus secundus*	Lopsided Rush	Summit (1929)	SH	State Historical[3]	Endangered
	Botrychium rugulosum	St. Lawrence Grapefern	Unknown (1915)	S1	Very Rare	
	Pterospora andromedea	Pine-Drops	Pine woods (1917)	S1	Very Rare	
	Juncus torreyi	Torrey's Rush	Damp roadside (1920)	S2	Rare	
	Piptatherum pungens	Short-Awned Mountain-Rice Grass	Dry shaded ledges (1892)	S2	Rare	Threatened
	Platanthera hookeri	Hooker's Bog-Orchid	Rich woods (1903)	S2	Rare	Threatened
	Lespedeza violacea	Wand Bush-Clover	Dry woods (1920)	S2S3	Rare	
	Ophioglossum pusillum	Northern Adder's-Tongue Fern	Pasture (1915)	S2S3	Rare	
	Dichanthelium xanthophysum	Pale-Leaved Rosette-Panicgrass	Unknown (1922)	S3	Uncommon	
	Poa saltuensis ssp. saltuensis	Drooping Bluegrass	Unknown,(1922)	S3	Uncommon	

[1] For historical species, includes year of last observation	[3] All known occurrences in VT are from historical records
[2] For a full explanation of these rarity ranks, visit the Vermont Natural Heritage Inventory website: http://www.vtfishandwildlife.com/wildlife_nongame.cfm	

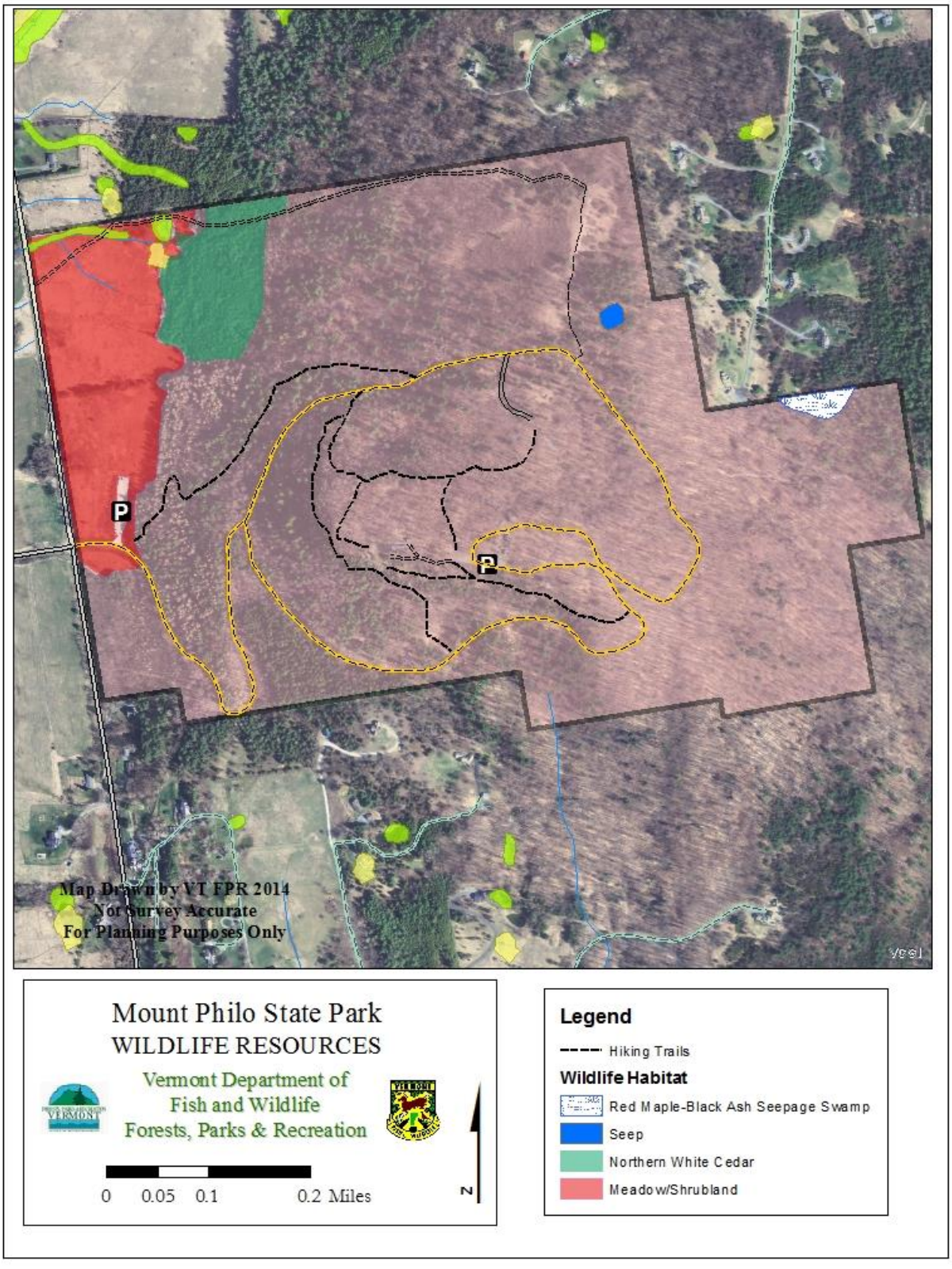
Table 3: Rare, Threatened, & Endangered Animals Potentially Found at Mt. Philo State Park

Rare, Threatened, and Endangered Animals Potentially Found at Mount Philo State Park

	Species Name	Common Name	Sites Where Found[1]	State Rarity Rank[2]	Rarity[2]	Legal Status
SPECIES THAT MAY BE PRESENT	*Myotis leibii*	Eastern Small-footed bat	Hardwood forests	S1	Rare	Threatened
	Myotis lucifugus	Little Brown Bat	Hardwood forests	S1	Rare	Endangered
	Myotis sodalis	Indiana Bat	Hardwood forests	S1	Rare	Endangered
	Perimyotis subflavus	Tri-colored Bat	Hardwood forests	S1	Rare	Endangered
	Bombus affinis	Rusty-patched bumblebee	Shrub land	SH	Rare	Endangered
	Bombus ashtoni	Ashton Cuckoo Bumble Bee	Shrub land	SH	Rare	Endangered
	Bombus terricola	Yellow-banded Bumble Bee	Shrub land	S2S3	Rare	Threatened

[1] For historical species, includes year of last observation	[3] All known occurrences in VT are from historical records
[2] For a full explanation of these rarity ranks, visit the Vermont Natural Heritage Inventory website: http://www.vtfishandwildlife.com/wildlife_nongame.cfm	

Figure 5: Wildlife Habitat Map



C. Forest Health and Resiliency Assessment

1. General Forest Health: In January 1998, an ice storm of unusual magnitude swept through the northeast region causing extensive damage to forests and property. From January 4 – 9, sustained precipitation in the form of rain, drizzle, freezing rain, freezing drizzle, sleet and snow fell on the northeast. Ice accumulations of 2 – 3 inches were reported in some areas. Gusting winds accompanied additional precipitation events later in the month, causing great stress and damage to the ice laden trees. In Vermont, the storm damaged 940,000 acres of forests including Mount Philo. An estimated 25-40% of greenbelt trees in Burlington were injured.

   Prior to the ice storm, Mount Philo contained 5 coniferous plantations (Scots/jack pine, European larch, red pine, white pine and Norway spruce) dating back to 1925-1935. Natural vegetation included a variety of northern hardwoods including: sugar maple, red oak, white ash, and beech. Red oak-white oak and sugar maple-beech stands covered 63% of the park, while Scots/jack pine accounted for 23%. A localized tornado struck the north side of the mountain in 1993. The ice storm damaged almost every tree on Mt. Philo (see appendix). About ¼ of the park was logged including the red pine plantation to salvage damaged and dangerous trees.

   Several studies were initiated to assess impacts and monitor recovery. Photos of damaged oaks and sugar maple documented recovery from initial damage in 1998, through 2001 and documented crown restoration. Recovery was aided by wet spring and summer weather; it rained every day in June 1998.

2. Site and Elevation, etc.: Elevations within the state park range from 320 feet near the northwest corner of the property to 980 feet at the summit of Mt. Philo, the high point in surrounding landscape. Site conditions on MPSP are relatively dry with only seasonal streams and two small wetlands. Site conditions are particularly dry at summit and ridge to the southeast that are often impacted by drought conditions during dry summers. These conditions can result in reduced growth and increased tree mortality. Drought-stressed trees are often then attacked by secondary insects and pathogens. There are some moist coves that support rich-site vegetation. These sites are better able to tolerate dry conditions.

3. Browse Sensitivity Assessment: Deer activity on MPSP is limited by the near constant presence of people (and their dogs) and browse damage to sensitive plants and/or forest regeneration is not currently an issue.

4. Invasive Exotic Species Assessment: Invasive plants are a growing concern on MPSP. Invasive species tend to follow disturbance, thus activities that create soil disturbance or canopy gaps in the forest could result in the spread of invasive species. There are several terrestrial invasive plants which are having an impact on the diversity of native vegetation and quality of habitat found here. Predictably, most of that impact is in the most disturbed, and most recently reforested portions of the state park and in the fields where poison parsnip is invading. These more disturbed areas are associated with the development at the park entrance, below the entrance road, along the original northern boundary of the park, and on

the new acquisition. As these populations become established and begin to spread they are moving into the interior of the parcel along the hiking trails and park roads. Honeysuckle (*Lonicera* spp.) and barberry (*Berberis* spp.) are generally widespread with locally heavier infestations. Common buckthorn (*Rhamnus cathartica*) and bittersweet (*Celastrus orbiculatus*) are found in increasing numbers at the lower elevations, north of the House Rock Trail and on the Allmon acquisition. As their populations continue to grow and expand their impact on the surrounding forest and habitat will become more damaging. Populations of garlic mustard (*Alliaria petiolata*) are expanding in the campground area and beginning to spread up the Campground Trail. Increasing populations of poison parsnip (*Pastinaca sativa*) and purple loosestrife (*Lythrum salicaria*) are present in the meadow east of the Mt. Philo Road and north of the park entrance.

Management of invasive species can be challenging, costly and time consuming. Prioritization of that work relies on an understanding of the ecological impacts of individual species. Prioritizing management to focus on eliminating small, isolated populations is probably the best way to protect native plants, animals and habitats within the state park. In general, when invasions are at lower levels less effort (time and money) is needed to obtain higher levels of success. Conversely, when areas are highly infested, efforts increase and success decreases. Along with that strategy, attempts to control the perimeter of the core infestation by focusing management at the edges will help to keep the infestation from expanding into invasive-free areas. Attempting control at the core of the infestation is expensive, labor intensive, and will require a dedicated, long-term effort. Efforts at management on MPSP have included both mechanical (i.e. hand pulling) and chemical (foliar and cut & paint applications). The district Habitat Restoration Crew has targeted bittersweet north of the House Rock Trail. They've also worked with volunteer groups to pull honeysuckle and garlic mustard in the campground. Repeated management will be needed to achieve some level of success. Without intervention, these species will continue to have an increasing negative impact to natural communities, native plants and wildlife habitats and well as to recreational use (i.e. wildlife viewing, access, increase tick populations).

Direct management of invasive species is only part of the solution. Considerations must be made to enhance native species presence in the forest. strategies include: direct planting of native trees and shrubs, especially in areas where invasive species have been removed or other disturbed areas; direct release of native vegetation through the removal of competing invasive plants; by implementing mowing regimes that discourage invasive plants in favor of native herbaceous and shrub species; and by instituting a park landscaping plan that only uses native and non-invasive species in ornamental plantings.

Climate change will likely worsen the proliferation of invasive species by giving them a competitive advantage. Warming temperatures will facilitate their northward expansion providing the opportunity for them to take advantage of weakened ecosystems and outcompete native species. The increased forest disturbance associated with climate change provides an optimal setting for these disturbance-loving species to spread.

Table 7: Invasive Exotic Plants of Mt. Philo State Park

Invasive Plants of Mt. Philo State Park				
Species Name	**Common Name**	**Distribution**	**Sites Where Found**	**Present Threat to Native Plant Communities**
Lonicera spp.	Honeysuckle	scattered	Throughout	Low/moderate
Berberis thunbergii	Japanese barberry	scattered	Throughout	Moderate
Celastrus orbiculatus	Oriental bittersweet	Allmon Lot	Northern	High
Acer ginnala	Amur maple	ornamental	At base	Low
Lythrum salicaria	Purple loosestrife	Wet meadow	Wet field	Low
Acer platanoides	Norway maple	South of entrance	At base	low
Rhamnus cathartica	Common buckthorn	Throughout, north of House Rock Trail	Northern	moderate
Pastinaca sativa	Poison parsnip	Open fields	fields	Moderate/high
Alliaria petiolate	Garlic Mustard	northern	Campground	Low/moderate

Invasive Exotic Insects – Exotic insects are not known to have significant impact on these lands currently but they are continually being monitored across the state. This includes some insect pests that are not yet known to have reached Vermont but whose introduction would have devastating effects on our forests.

Emerald ash borer (EAB) is an exotic beetle whose larvae eats and kills ash trees. It was transported to this country from Asia, probably in wood-packing material on cargo ships. It was first identified in 2002 in southeastern Michigan. EAB has not been located within Vermont but is currently found in all of our neighboring states. Camping and the associated movement of firewood can contribute to the spread of these insects. Vermont's firewood quarantine is in place to protect forest health by preventing the long-distance movement of these wood-borne insects into the state.

Climate Change Assessment: If the most conservative current models of climate change are accurate, Mt. Philo State Park, like the rest of the region, will experience strong impacts over the next 50-100 years. These changes may have important consequences for forest nutrient cycling, timber productivity, forest pest ecology, wildlife habitat, and winter recreation opportunities in the forest. Assessing changes in our climate and the potential effects on Mount Philo will influence how we manage the forest to improve resiliency and adaptability.

Historical data have shown changes across Vermont over the past 50 years, including:

- Summer temperatures increased 0.4°F per decade
- Winter temperature increased 0.9°F per decade
- Spring thaw arrives 2.3 days earlier per decade

- Precipitation increased 15-20%, with 67% from "heavy precipitation" events

Anticipated climate change effects include:
- Increased temperatures, especially in winter
- Increased precipitation, especially rain in winter
- Increased extreme weather events, including floods, wind storms, and fires
- Longer growing seasons, shorter winters
- Changes in biological interactions

These potential changes are expected to have a range of effects on the forested ecosystems of the Mount Philo as with forests across the State. Table 8 lists examples of anticipated effects and time frames of many key climate factors on upland forests of Vermont.

Table 8: Expected Climate Change Effects and Timeframes[1]

Key Climate Change Factors	Expected Effects	Timeframe
Warming temperatures	Compositional changes associated with changes in thermally suitable habitat (loss of cold-adapted species and increase in warm-adapted species)	Long-term, but localized effects could occur on a shorter timescale
	Increase in overwinter survival of pests, such as balsam and hemlock woolly adelgid	Immediate
	Increased physiological stress, resulting in increased susceptibility to pests and disease, decreased productivity and increased tree mortality	Immediate
	Increased evapotranspiration, resulting in a decrease in soil moisture; moisture limitation/stress negatively impacts productivity and survival in many species	Immediate
	Increased decomposition rate of organic material may enrich soils and make them more suitable for competitors	Long-term, but localized effects could occur on a shorter timescale
	Decrease in winter snow pack, leading to change in deer browsing patterns, which affects regeneration	Immediate
	Lengthening of growing season resulting in changes in species competitiveness, especially favoring non-native invasive plants	Immediate

[1] Source: TetraTech. 2013. Climate change adaptation framework. Prepared for Vermont Agency of Natural Resources.

Key Climate Change Factors	Expected Effects	Timeframe
Increase in extreme storm events	Increased physical damage and disturbance, leading to gap formation, which could facilitate the spread of invasive plants	Immediate
Phenology (timing)	Longer growing season	Immediate
	Early spring thaws/late frosts can damage buds, blossoms and roots, which affects regeneration	Immediate
	Change in freeze/thaw cycles could disrupt regular periodicity of cone cycles	Immediate
	Asynchronous changes in phenology may negatively impact some migratory species and pollinators	Immediate
Increase in fire risk	Loss of fire intolerant species and increase in fire tolerant species, such as red and pitch pines	Long-term, but localized effects could occur on a shorter timescale
Increase in fire risk *(cont.)*	Earlier and warmer springs and smaller snow packs, and hotter drier summers conducive to increased fire risk	Immediate
Increase in number of short-term droughts	Declines in forest productivity and tree survival associated with water limitation	Long-term

1. **<u>Resiliency, adapting forests to climate change</u>.** Implementing climate adaptation strategies can help to set the stage for forests that are more resilient and better able to adapt to changing climate conditions. Many of these strategies are already an integral part of sustainable forest management in Vermont. Six general adaption strategies have been identified (Horton et al. 2015) to create resilient forests.
   - Sustain fundamental ecological functions – protect soil quality, nutrient cycling, and hydrology: *retain species with high nutrient cycling capability; retain or enhance coarse and fine woody material for nutrient cycling and soil protection; and conduct forest management on frozen or snow-covered ground.*
   - Reduce impact of biological stressors – pests and pathogens, invasive species and herbivory: *Maintain or enhance native species diversity; manage invasive species as an important part of northern hardwood silviculture; implement strategies that protect regeneration from browsing (i.e. fencing, leaving large tops).*
   - Moderate impacts of severe disturbance: *Promote age class diversity and vigorous crown development.*
   - Maintain or create refugia – increase ecosystem redundancy*: maintain site quality and existing species composition where they may be better buffered against climate change and short-term disturbance.*

- Maintain or enhance species and structural diversity: *Promote age class and species diversity. Maintain species that naturally occur in a natural community and consider including species that may be better adapted to future conditions (i.e. oaks, hickories, white pine). Retain biological legacies.*
- Promote landscape connectivity: *Maintain or create forested corridors to help to promote movement of species – trees and wildlife.*

Forest management approaches to use at Mount Philo to prepare for current and future climate changes.

Table 9: Forest Management Adaptation Strategies

Focus Area	**Adaptation Strategy**	**Forest Management Approach**
Soil Conservation	Protect soil quality	1. Rebuild soils at upper elevations by leaving substantial amounts of big trees, in addition to small trees and branches, on the ground to decompose and build soil organic matter. 2. Install fences to direct hikers to trails and avoid steep erodible soils. 3. Allow for revegetation or soil stabilization to restore compacted soils. 4. Minimize trail widening. 5. Close trails during mud season and extending periods of rain.
	Sustain nutrient cycling	1. Keep species with high nutrient cycling capacity such as basswood. 2. Keep an abundance of dead trees and branches on the forest floor to maintain moisture, soil organisms and nutrient cycling functions.
Stormwater	Reduce erosion and soil loss	1. Maintain adequate tree canopy and ground cover to increase water infiltration during rain storms. 2. Upgrade culvert sizes to accommodate greater precipitation in the future.
Pests	Reduce the impacts of insect pests and pathogens	1. Create a diverse mix of tree species and tree ages to reduce forest impacts. 2. Avoid introductions of new pests that can be transported on firewood or other carriers.
Invasive plants	Protect native plant populations	1. Prevent the introduction and establishment of new invasive plants. 2. Prioritize & remove existing plants where appropriate.
Severe storms	Reduce forest risks of long-term impacts from	1. Retain edge trees to help protect forest trees. 2. Harvest over a few entries to gradually increase resistance of residual trees to wind.

	storms	3. Minimize damage to residual trees that increase their vulnerability to breakage. 4. Reduce windthrow risk by creating canopy gaps that have an orientation and shape informed by prevailing winds.
Rare plants	Maintain rare and sensitive species	1. Manage vegetation to create favorable growing conditions. 2. Retain multiple populations representing different environmental conditions to reduce risk of maladaptation. 3. Reroute roads or trails. 4. Minimize disturbances in vicinity of sensitive species. 5. Monitor regeneration to detect reproductive success or species migration.

D. Forest Management Assessment

1. History of Forest Management on Parcel: MPSP has had a varied forest management history since the time of state ownership in 1924. At the time of acquisition much of MPSP consisted of open land. Reforestation, both natural and through planting, began early in state ownership. Beginning in the mid-1920s and continuing into the 1930s, with the Civilian Conservation Corps, over 50,000 trees were planted. Species included scotch, red, jack and white pine as well as Norway spruce. Early forest management included removal of currant and gooseberry bushes in an effort to protect the newly planted pine from white pine blister rust, a non-native pathogen (from Asia at turn of 20th century) that requires those plants as an alternate host to complete its lifecycle.

   The ice storm that struck northern New York, Vermont, New Hampshire and Maine in January of 1998 had widespread impact on MPSP. As a weather event, this storm was part of the cycle of natural processes that shape the New England forests. From a timber and forest product management perspective the damage was widespread and extensive; nearly every tree had some damage. The plantations, particularly the red and scotch pine were particularly hard hit. A salvage operation was undertaken in order to remove broken and severely damaged trees; those that made trails, roads and recreation areas impassable; and those that posed the greatest hazard to park visitors and managers. Cleanup was difficult, hazardous and expensive. The operation was conducted using a mechanical harvester to protect the people doing the work. Not all portions of the park were part of that salvage operation. See the Forest Health Assessment (p. 30) for more information on the ice storm.

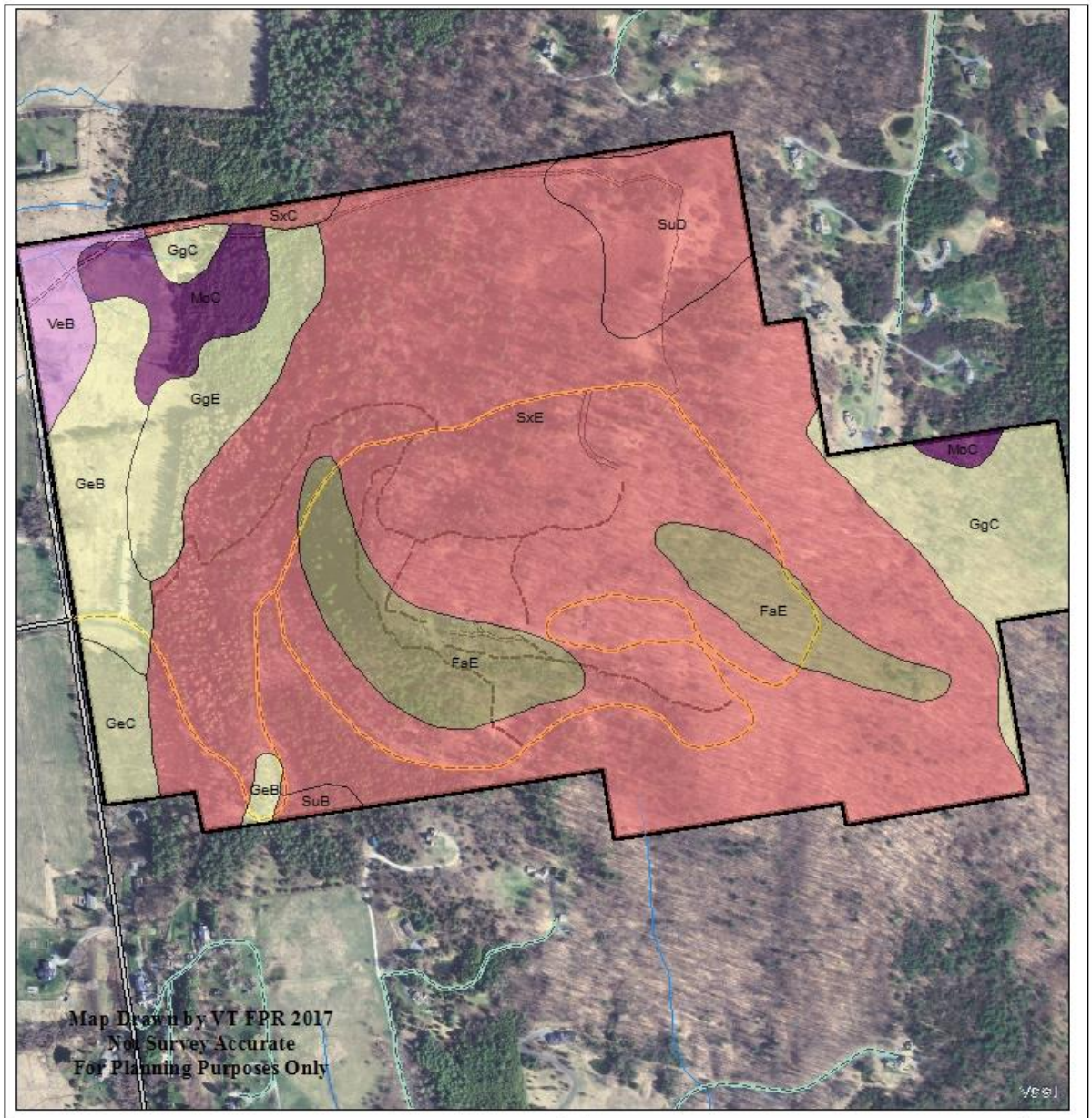
   Managing to promote a healthy and resilient forest can lessen the severity of negative consequences from natural events. Such measures would not eliminate the natural event but would rather improve the capacity of the forest to absorb some of these pressures and maintain composition, structure and ecological functions. Protecting soil quality; reducing the impact of pests, pathogens and invasive species; moderating impacts of severe

disturbance by promoting age and species diversity; maintaining site quality; and maintaining forested corridors are important qualities of a resilient forest.

Of course, natural events, such as the 1998 ice storm, do happen requiring action to address safety concerns, storm cleanup and the potential to salvage economic value from the damaged trees. Often the value of the salvaged trees helps to pay for the expensive cleanup operation. Salvage operations are necessary to restore management and recreational access within the state park and remove hazards in developed recreation areas. The degree to which these items are addressed depends on the scope of the event and damaged caused.

2. Soils and Site Productivity: Healthy soils are the foundation for healthy forests, sustainable forest and habitat management, and climate adaptation. Soil organic matter is a critical source of nutrients and important for water holding capacity. Practices that help to promote healthy soil include maintaining woody debris (including large trees) maintaining higher residual basal area to moderate soil temperatures and moisture fluctuations and promoting native species regeneration. Primary soils include:

Figure 6: Soils and Site Class Map



- Stockbridge and Nellis stony loam – mapped together, these soils are very deep, well drained and formed in calcareous till derived from calcareous shale and limestone. These soils are often saturated with water in spring and during rain but dry quickly when conditions dry.
- Farmington extremely rocky loam – shallow, well-drained soil formed on glaciated uplands. Bedrock is at a depth of 10-20". Often found on convex slopes with rock outcrops. These soils are classified as potentially highly erodible.
- Georgia extremely stony loam – stony, very deep and moderately well-drained soil found on glaciated uplands, derived from limestone and calcareous shale. With a depth to bedrock of 60", these soils have the potential to be highly erodible. Surface run-off is slow to moderate and soil can become clumped when tilled wet.
- Vergennes clay – very deep, moderately well-drained soil on glacial lake plains formed in calcareous estuarine clays. Depth to bedrock is greater than 60". These soils are potentially highly erodible.

3. Existing Conditions and Dominant Forest Types: Current forest conditions vary with site conditions such as soil productivity, aspect, elevation, and with past management practices, land use and natural disturbance. On MPSP, the forest stands are generally fully to overstocked with pole to sawtimber size trees. There is an elevational division with more intact forest in undisturbed locations at higher elevations and to the south and east and more disturbed forest at the lower elevations, high use areas and to the north and west.

   Lack of suitable access, park infrastructure and presence of invasive plant species present operational challenges to timber management. Management of the forests at MPSP will focus on maintaining a healthy, resilient forest of native species adaptable to a changing climate and providing healthy habitat for a variety of wildlife species. Recognition of the importance of scenic and historic resources and understanding that a healthy forest serves as the setting for high-quality recreational experiences so valued at MPSP are important management considerations.

   The proliferation of invasive plant species within the forest, left unmanaged, are a growing impediment to successful regeneration of native forest species. Their presence negatively affects forest composition and resiliency, natural community health, wildlife habitat quality, climate adaptability, and the quality of the recreational experience. Successful forest management must strategize and prioritize management of invasive species to protect intact native forests and maintain natural community composition.

   a. Regeneration/Age Class Distribution – Regeneration is generally unacceptable throughout MPSP in that new tree seedlings and saplings are not establishing at sufficient levels to ensure a future forest and a present forest of sufficient structural complexity. Regeneration varies significantly between areas with large invasive species populations and those without, as well as areas of concentrated recreation activity and those more

remote. Generally, lower elevation hardwood stands and softwood plantations have little to no native tree regeneration. Canopy gaps created as a result of the 1998 ice storm have adequate regeneration, especially in those more intact forests away from disturbed areas.

b. Dominant Forest Cover Types – A forest cover type is a point-in-time identification of the main forest canopy vegetation. They are discreet, predictable associations of tree species that occur within a set of conditions. Natural communities are, by definition, a description of late successional condition and consider many elements in addition to canopy vegetation (i.e. geology, hydrology, climate, natural disturbance). In many instances forest cover type and natural community type descriptions are similar. At other times, particularly when the cover type reflects early successional tree species or a plantation, the two may be different. What follows is a general overview of forest cover types based upon information derived from the FOREX (forest examination) inventory completed in 2014, management records, and interpretation of aerial photography.

   The forests of MPSP are dominated by northern hardwoods, oak-hardwood and mixed wood forest types. Pockets of white pine and other softwoods are found throughout. An 8-acre cedar stand is at the northern boundary of the state park. Lower on the slope and adjacent to developed facilities invasive species become much more common and in places, replace nearly all the native understory vegetation.

c. Health/Vigor of Timber Resource – Soils are productive for growing trees on most of the state park. Tree health and quality vary throughout based on stem breakage and tree recovery from the 1998 ice storm. Tree health and quality is best where soils are deeper and more fertile.

d. Access/Operability – Forest management access to MPSP is most suitable from the north road along the northern state park boundary. The road is well built as a forest management access road and is constructed of gravel, stone and native material. This road provides suitable access to the northern and eastern portions of MPSP. Access via the park road system is problematic due to the steep, narrow, paved road. Any management in portions of the state park that must be accessed via that road system will need to consider equipment size and weight so as not to damage the road infrastructure and season so as not to impact state park operation.

Table 5: Site Class Management Potential

Site Class	**Potential Productivity** (cubic feet of wood/acre/year)	**Site Index** (height at age 50)		**Acres**
Site Class I	>85 cubic feet	White Pine Northern Hardwoods	70’ 60’	0
Site Class II	50 to 84 cubic feet	White Pine Northern Hardwoods	60-69’ 53-59’	211
Site Class III	20 to 49 cubic feet	White Pine Northern Hardwoods	50-59’ 45-52’	0
Site Class IV	<20 cubic feet	White Pine Northern Hardwoods	50’ 45’	21

Table 6: Dominant Forest Types

Type	Major Species	Acres	Condition	Goals
Northern Hardwood	Sugar maple, white ash	80	Variable quality and condition, regeneration generally inadequate but adequate in most gaps.	Maintain or enhance forest health and vigor. Enhance climate adaptability. Manage invasive species.
Oak-hardwood	Red oak, bitternut hickory hophornbeam	34	Variable quality and condition, regeneration generally inadequate but adequate in most canopy gaps.	Maintain or enhance forest health and vigor. Enhance climate adaptability. Manage invasive species.
cedar	Northern white cedar	8	Fair quality and condition. Regeneration inadequate.	Remnant of past land use. Maintain cedar as long as practical as diverse habitat component.
Oak-pine	Red oak, sugar maple, white pine	64	Variable quality and condition, regeneration generally inadequate but adequate in most gaps.	Maintain or enhance forest health and vigor. Enhance climate adaptability. Manage invasive species..
Norway spruce	Norway spruce	5	Fair quality and condition. Regeneration inadequate.	Maintain stand health & vigor for diversity of habitat, and as historic planting as long as practical.

E. Water Assessment

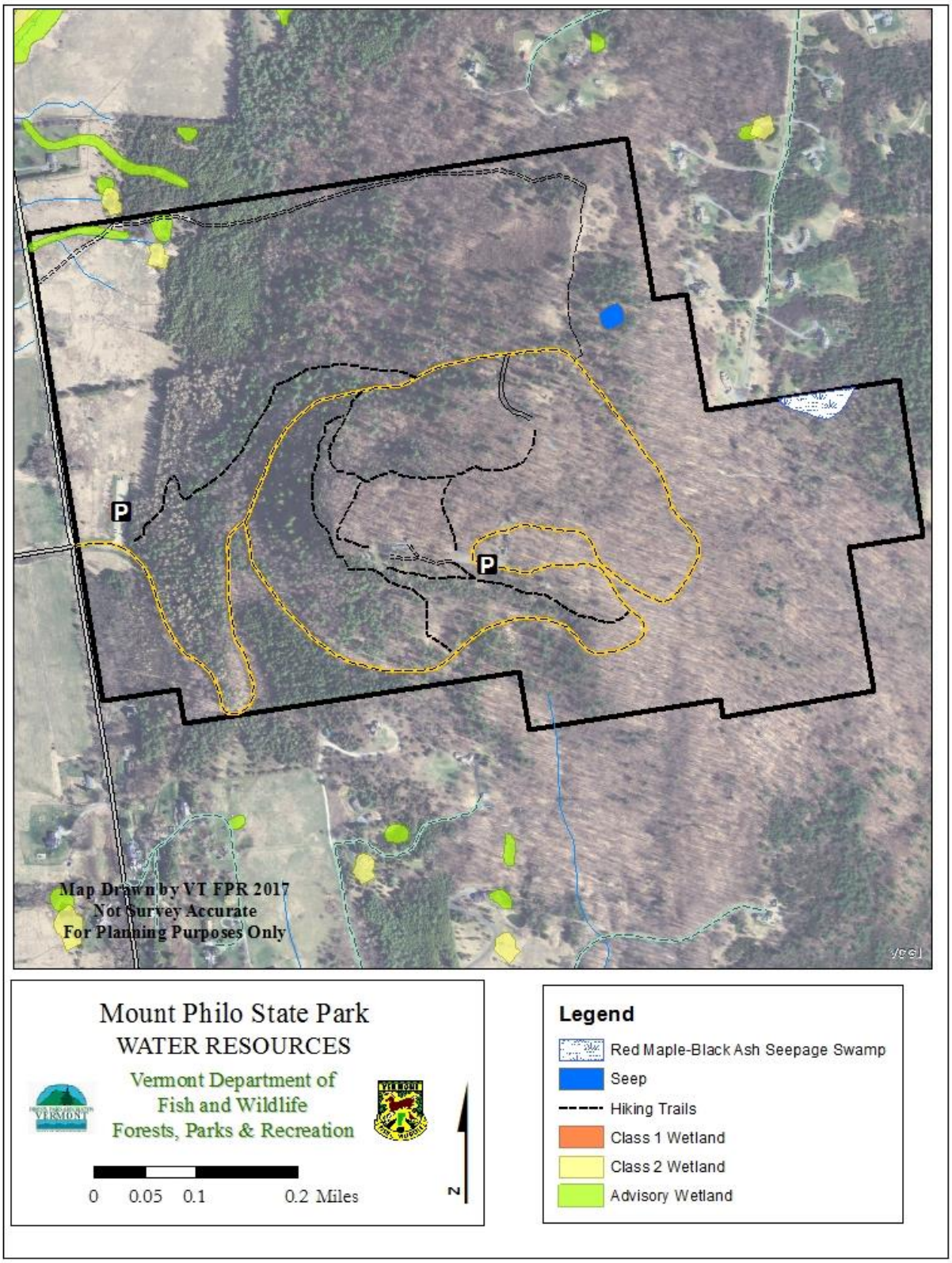
1. Watershed Description: Mount Philo State Park is drained primarily by Kimball Brook, a relatively small tributary that drains directly to Lake Champlain. Kimball Brook begins northeast of the Mt. Philo Road and One Mile road intersection. It flows southwest crossing Route 7 and Greenbush Road before turning northwest and enters Lake Champlain at the south end of Town Farm Bay. Watershed land use is field and cropland with increasing residential development, especially in the subwatersheds near Route 7. Many areas have little to no woody riparian buffer vegetation. Total watershed area is 2.45 square miles. Almost the entire stream appears to have been straightened historically with much current channel migration evident. Water quality monitoring data indicates that a section of Kimball Brook is considered "stressed" due to elevated phosphorus and sediment concentrations in this agricultural-dominated Lake Champlain direct tributary. A small portion of the Park drains southeasterly towards Lewis Creek, but not directly.

2. Relationship to Basin Plan and Basin Plan Recommendations: Kimball Brook has been identified in the Northern Lake Champlain Direct Drainages Tactical Basin Plan (August 2015) as a priority for agricultural land use runoff mitigation, as well as to manage stormwater runoff from municipal and private roads.

3. Flood Resiliency and Climate Change: In Vermont, the higher global temperatures resulting from climate change are expected to lead to earlier thawing of Vermont's rivers, lakes and ponds and snowpack in the mountains. In addition, stream flows' yearly averages are expected to continue increasing over the coming decades with high flows occurring more frequently. These events are expected to lead to increased erosion over the landscape, including within river channels. As part of its effort to address climate change, the Agency is working with communities to enhance their flood resiliency. Working towards resiliency means both proactively reducing vulnerabilities to flooding and flood damage and improving response and recover efforts when flood events do occur, so that communities bounce back quickly from natural resource, social and economic impacts. Reducing vulnerabilities includes efforts to diffuse stormwater flows from buildings, over roads, especially in areas with slope and erodible material.

   Recommended Strategy: Inventory, assess, monitor trail and road network and associated infrastructure on State Park land to more fully understand flood resiliency challenges and opportunities on ANR lands.

Figure 7: Water Resource and Fisheries Map



F. Fisheries Resource Assessment

1. Description: There are no permanent streams that support fish habitat on MPSP.

G. Historic and Cultural Assessment

1. Description: The rich history of Mt. Philo State Park has been the subject of several cultural/historic resource reports and investigations related to periods of pre-contact, early settlement and early park development. Together they tell a long story of land use at MPSP.

   Native American and Pre-Historic Sensitivity Analysis
   An archeological pre-contact site sensitivity assessment was done in 2009.[2] Based on modeling supported by Geographic Information System (GIS), the data helps to draw conclusions on how humans used the landscape. Providing a basis for understanding of pre-historic land use patterns, this analysis cites steepness of slope and lack of water as guiding factors that limit sensitivity for pre-contact resources and helps to focus subsequent study and field investigation. References to the Native American name for Mount Philo include *madegwasewapskak* – at rabbit rock or *Mateguasaden* – rabbit mountain.[3]

   Early Settlement and Industrial History
   The *Mt. Philo State Park Cultural Resource Management Plan* [4] identified two archeologically sensitive areas within the state park using a combination of site assessment and archival review. The report identified two areas of potential significance. The first area where sites may be found is at a feeder brook to Lewis Creek on the southeast portion the park. If they exist, these areas would likely be small, short-term sites. According to the report the remainder of the state park lands lacked indicators of archeological sensitivity (i.e. steep slopes, poor accessibility, lack of fresh water) although Mt Philo itself, is a prominent feature in the regional landscape and may have been a pilgrimage site for pre-contact native Americans. The second area of potential significance identified is a 19th century farm complex, known as the Smith Jones farm, near the park entrance on both sides of the entrance road and adjacent to the Mt. Philo Road. The Smith Jones farm at the base of Mt. Philo was likely involved in small-scale agriculture prior to 1857. Two structures are evident on the 1857 Wallings and 1869 Beers maps. The southernmost structure (no longer shown on the 1906 USGS map) is likely the main house, the other, to the north, may be a barn. Site evaluation revealed remains of a rock-lined hand-dug well and foundation of a small building (agriculture related). File reports differ on what happened to the farm house. A subsequent report [5]commissioned in preparation of the construction of the lower parking lot conducted a

[2] Source: UVM Consulting Archeology Program. 2009. Precontact Sensitivity Analysis and GIS Mapping for ANR Mt. Philo State Park.
[3] Source: http://koasek-abenaki.com/language.html
[4] Source: Frink, Doug. 1987. Mt. Philo State Park Cultural Resources Management Plan.
[5] Source: Frink, Doug. 1987. Mt. Philo State Park Archeological Assessment of the Smith Jones Farm Complex.

field study, including test pits. It suggested that evidence of the house structure was destroyed in the 1930s when the CCC constructed the current entrance road to the park and that pasturing contributed further to site disturbance. Documentation prepared for the nomination of Mt. Philo for the National Register of Historic Places[6] states that the original Smith-Jones farm was purchased by the Lewis's and the house was replaced by the Mt. Philo Inn in 1896. Other information states that the acquisition may have been as late as 1901. The assessment of the farm complex concluded that it was unlikely that further research would yield significant archeological information. Additional review was conducted prior to construction of the new waterline and the project that will bring power to the contact station at the park entrance.

Early Recreational Use, Development as a State Park, and Civilian Conservation Corps

The summit of Mt. Philo has been an attractive recreational destination for many years. In the late 1800s, William Higbee, a Charlotte resident and journalist, wrote that Mt. Philo was named for an "Indian fighter and famous hunter" named Philo who camped on the mountain. One of the first written references to the "Devil's Chair" was in an 1896 article that describes a natural rock outcrop by that name.

Records of prior ownership are inconsistent however, ultimately Frances Humphreys of Brookline, Massachusetts, widow of James Humphreys, gifted the 159-acre property to the State of Vermont in 1924. Originally managed by the Vermont Forest Service (now Vermont Department of Forests, Parks and Recreation), Mt. Philo State Park was known as "Mt. Philo State Forest Park"[7]. The entrance fee was 25 cents per day. Camping was $1 per night.

The park road system was constructed in stages by various entities between 1901 and 1933. Inn owner Frank Lewis began construction on the original carriage road to the summit in 1901. Using teams of horses with plows, a carriage road was constructed on the southern slope for guests to reach the summit. During that same time overlooks, gazebos along the road, and iron railings at summit vistas were installed. The 1926 Department of Forests, Parks & Recreation Biennial Report states that the road was narrow and not recommended for auto travel. As a result, in 1929, the Department made improvements to the road by widening and relocating sections to accommodate safer travel. In 1933, the Civilian Conservation Corps (CCC) built the "down" road and re-worked portions of the existing road. A gravel pit on the north side of the up road may be associated with the CCC construction at the park. At least one CCC-era stone culvert remains intact with headwalls constructed of mortar-laid local stone. Some sections of the original road are still visible.

The present park entrance was established in 1929. Early Department records show increasing popularity of the park with 300 visitors/day in 1929, 15,000 visitors in 1932[8], and 25,000 visitors in 1936. A caretaker and lookout watchman were employed during the summer months in the late 1920s.

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[6] Source: National Register of Historic Places Form. Prepared by Catherine Quinn, UVM Historic Preservation Program.
[7] Source: State of Vermont. 1926. Biennial Report of the Commissioner of Forestry of the State of Vermont.
[8] Source: State of Vermont. 1932. Biennial Report of the Commissioner of Forestry of the State of Vermont.

The work of the CCC is evident throughout the park. In the early 1930s, a CCC unit was assigned to Mt. Philo and a camp was established at the base of the mountain, north of the current park entrance. Between 1933 and 1938 the CCC worked on the park access road, planted thousands of trees, and built much of the state park infrastructure. Park facilities constructed by the CCC include the Ranger house (1934), picnic shelter (1934), toilet building (1937), power lines (1935), and stone fireplaces (1935). [6] Some picnic areas had already been established prior to the CCC, although they created extensive picnic areas during their time at MPSP. The campground was established between 1932 and 1938. The CCC built tent sites, picnic tables, and fireplaces. The upper parking area is associated with their work, although portions likely existed prior to that period.

In the spring of 1925, with the goal of reforestation, the Vermont Forest Service planted 42,000 Scotch pine, and 5,000 Jack pine. Current and gooseberry plants were eradicated to protect those pine plantations from white pine blister rust. In 1929, an additional 16,000 European larch were planted. Planting efforts continued with 3,000 Norway spruce, 3,000 white pine and 2,000 red pine planted by the CCC in 1935. Much of those plantations were destroyed in the 1998 ice storm.

Hiking Trails

The 1938 plan, *Landscape Plan for Mt. Philo State Forest Park*, [9]proposed the recreational development of the park. It recognized the importance of the forest to the recreation experience and emphasized preservation of the wooded areas while accommodating recreational use and development of facilities.

At least some hiking trails existed prior to state ownership, others were constructed by the CCC. Trails, as they exist today, were built by the department over the years with help from the Vermont Youth Conservation Crew (VYCC) and have been worked on since with both VYCC and Vermont State Trail crews. The current location follows some of the trail alignment from that 1938 plan but many sections have been relocated and improved in the years since in order to increase sustainability and accommodate increasing use.

Shortly after the first road was built, a wooden observation tower was constructed on the summit, financed by Anna Humphreys (James Humphreys sister) [6]. Built in 1905, the 4-story wooden tower had an internal staircase, enclosed lower levels, and an open top level. It was located approximately 20 feet west of the current location of the ranger's house. No evidence remains of that structure. In the late 1920s, the Vermont Forest Service constructed a new 60-foot tower with glass enclosure at the top level [7]. This second tower was dismantled in the late 1970s. Remains of the foundation are still visible.

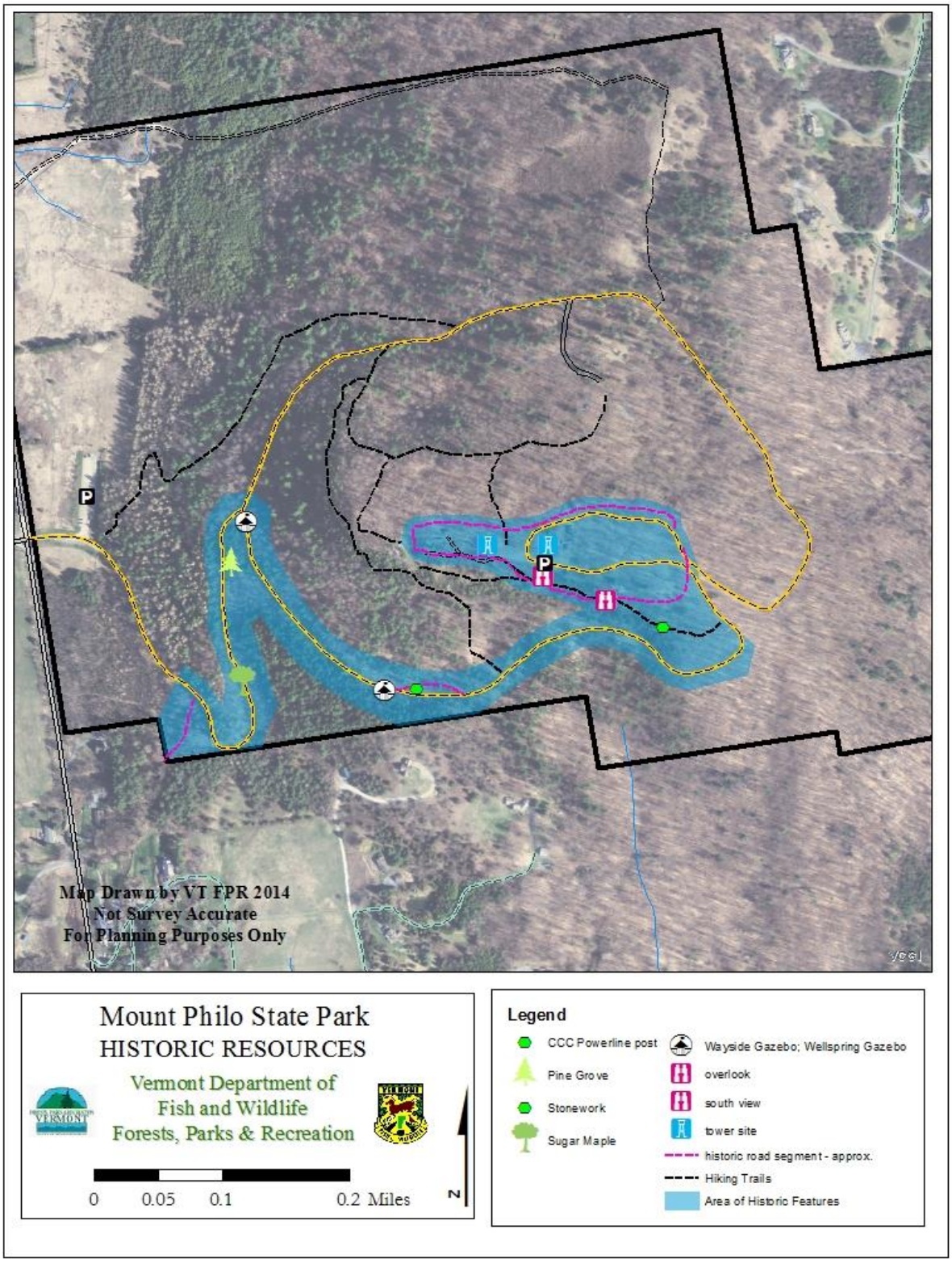
Mt. Philo State Park was included on the National Register of Historic Places in 2001 (#01001286)[6]. The registration form prepared for the nomination is rich in history

[9] Source: State of Vermont. 1938. 1938 Landscape Plan for Mt. Philo State Forest Park.

documenting the Civilian Conservation Corps efforts within the park and the property's role in the area's growing recreational /tourism industry.

2. Existing Conditions: Remains of historic features exist throughout the state park, although they primarily occur within the developed portions of the park. Condition of these resources vary, and many have not fared well with the passage of time. There is ongoing need for the protection of historic resources during implementation of management activities and park development and from the impacts of high park visitation. In order to better protect these features, it is important to better understand and interpret historic resources and their context within the park.

Figure 8: Historic Resource Map



H. Recreation Assessment

1. Description: Mt. Philo State Park supports a natural, forested landscape with a prominent peak at its center overlooking the surrounding valley. It offers opportunities for hiking, walking, camping, nature viewing, picnicking and more. MPSP is extremely popular given its location in the Champlain Valley near the largest population centers in Vermont, its natural landscape, and the spectacular views from the summit. The park is also increasingly popular for school groups, weddings, and other events. Visitors are passionate about the state park. Heavy visitation occurs year-round; often for exercise, hiking and family gatherings (Recreation Survey 2014).

Connecting park visitors to Vermont's natural resources through recreation at Mt. Philo presents a great opportunity, however, one that must be carefully managed. The high use levels at MPSP have led to a variety of impacts to the environment, the recreational experience and the facilities at the state park. The solution to managing this increasing use is not as simple as expanding facility capacity. In fact, unrestrained expansion will lead to degradation of the very values visitors to the state park are seeking. In a 2002 survey for Vermont's Statewide Comprehensive Outdoor Recreation Plan (SCORP), more than 4 times as many Vermonters indicated that spending money to maintain current facilities was more important than creating new. In a 2014 survey of public interested in the management of Mt. Philo State Park, 70% stated that resource protection and wildlife habitat were important values at the state park and 75% stated that ecological values were of primary importance. Of those surveyed, 67% felt that the number of hiking trails was enough or just right. The 2014 survey revealed that of those surveyed 87% visited MPSP for hiking, 45% for wildlife viewing, 59% for day use and 40% specifically for dog walking.

Recreation at MPSP has evolved over time with early documented use beginning at the turn of the 20th century. As early as the late 1800s and early 1900s visitors have come to Mt. Philo to experience nature, hike and spend time outside. Visitors rode in horse-drawn carriages to the summit, stopped at gazebos along the way to rest and enjoyed the views of the open Champlain Valley, as much of MPSP and the surrounding lands were not forested at that time. Some people hiked early versions of the trails that exist today.

High Use and Visitation

Visitors love Mt. Philo and are visiting the state park, hiking its trails and enjoying its facilities in very high numbers. Numbers of visitors has increased over the past decade. During 2015, over 51,000 people visited the park (paid visitors - day use and camping) during hours of park operation. Over a 15-month period in 2015 and 2016, trail counters recorded over 108,000 hikers using the House Rock and campground trails. As impressive as those numbers are, they only reflect park visitation based on trail counter data and those who have paid entry through the contact station. It includes only those who have visited during park operating houses, only entered through the front entrance, and only during park operation season. It does not include early morning hikers who use the road, those whose hike doesn't involve the House Rock Trail, those who come onto state land by avoiding the entrance or designated trails, or those who sue the park between October and May. So, the

real number of visitors to MPSP is likely much higher. This high use has implications for the health of the environment, the quality of the recreational experience, and the capacity of the state park facilities. The demand for recreation here includes both an increase in visitors as well as an increase in the types of activities. This changing use profile requires contemporary monitoring and maintenance of ecological health, the quality of the recreational experience, and the capacity of state park facilities. State ownership goals are meant to strike the balance between conservation of the natural resources and benefits of public recreational use; to this end it must be acknowledged that not all activities can happen in all places. Some activities may be considered appropriate on Mt Philo while others, due to resource limitations, ecological sensitivity, rare, threatened and endangered species, incompatibility with agency or department missions, or conflict with other uses and users may need to be explored elsewhere.

Although early recreational use of the land was enthusiastic and somewhat intensive, the number of users was relatively small and limited in scope when compared with current use. Visitor interactions, including conflicts, must be managed through thoughtful planning that results in an enjoyable recreational experience; and protection of the resources within which they take place.

2. Existing Conditions: Visitors value MPSP for many recreational experiences. In addition to the beauty of the park surroundings and view from the summit, the park's draw is inextricably linked to its value as a public resource in an area with limited hiking and viewshed opportunities on public land.

Existing Recreational Activities at MPSP:

a. Hiking and Hiking Trails – Hiking and walking at Mt. Philo State Park are extremely popular and represents the dominant recreational use. A 2014 survey of recreational use at MPSP revealed that 87% of respondents visited the state park for hiking. There are 1.4 miles of trails on MPSP that can be hiked to explore the forests, view the cliff band at the center of the property or reach the summit and its expansive views (see Table 10). Not all trails reach the summit but rather offer a variety of experiences for the hiker. Walking along the park road system to the top of the mountain or even combining sections of road with segments of trail is an increasingly popular activity. Hikers on the road encounter vehicles during the park operating season or when the park is open during the day.

   Hiking has been a popular pastime on Mt Philo since long before it became a state park. The hiking that has occurred over the years has been on deliberately constructed, designated trails, as well as along unplanned pathways (undesignated, "social trails") created without guidance, planning or authorization. In the 100 years of hiking and trail use on the mountain not all trails were well placed. This is due in part to the limited options on a small property, to steep grades and clay-based soils and lack of thought to sustainability. These issues have become more apparent in recent years with increasing use of the park and its trails. Over time, with responsible management and careful planning, sustainable trails have been constructed. The current network of trails

developed by FPR has been an ongoing project during the past 20 years since the trail network was re-established following the ice storm in the late 1990s. To accomplish the goal of sustainable trail management, FPR has funded the state trail crew, Vermont Youth Conservation Corps and seasonal staff to complete trail maintenance and construction projects.

The continued goal for trails at MPSP is to maintain a trail system that enhances the experience of hiking in a forested stetting while at the same time promoting a safe, enjoyable and sustainable trail experience which minimizes impact to natural resources. Trail maintenance projects will continue to focus on upgrading, widening, surfacing, and relocating sections of trail to more sustainable and suitable locations and conditions. Rock work, stone-filled stair boxes and wooden steps have been installed to improve trail conditions, increase safety, and mitigate erosion. Heavily used sections of trail have been widened and surfaced with gravel. High use and site conditions such as clay soils and steep terrain has led to real challenges in maintaining a high-quality hiking infrastructure and experience.

b. Dogs – Hiking with dogs or bringing them to the state park for exercise is a popular and growing use. It's an important part of the recreational experience for many. Unfortunately, there is an increased amount of dog waste (bagged and not) along trails and roads, resulting in a growing aesthetic, resource, site contamination, and health concern. Dog waste stations have been installed and have helped some. Owners are required to keep their dogs on leash at all times when the park is in operation. These rules do not officially apply in the off-season although it is requested that dogs be on leash at all times. Management strategies to address rule enforcement, dog waste, and negative dog-dog and dog-people interactions will continue as part of this long-range management plan and through state park operations. Rules and strategies may need to be modified to improve compliance.

c. Picnicking/Day Use – MPSP is most popular as a day use attraction. Visitors to the park either hike or drive to the upper parking area to enjoy views of the Champlain Valley and to picnic at the summit. The picnic area, first developed by the Civilian Conservation Corps, hosts an open area, picnic tables, and grills. A shelter and composting toilets are also at the summit.

d. Group Use and Events– The growing popularity of MPSP has led to increased visitation by school groups and bus tours. The historic CCC shelter at the summit is a popular venue for events. The beautiful setting makes it a favorite location for weddings, family reunions, work gatherings, fundraising and commercial events.

e. Snowmobiling – The Vermont Association of Snow Travelers (VAST), through its local club, SCAT – Shelburne-Charlotte Area Travelers, maintains 1.6 miles of designated trail within the state park. The trail is located on a combination of paved, park road and natural-surfaced woods road and includes a spur to the summit. The amount of snowmobile use is a function of snow which can be unreliable and of short duration in the Champlain Valley. The relatively rare occurrence of suitable conditions

make snow here even more valuable for snowmobilers. Conflicts with other winter uses occur as recreationists vie for limited space and conditions. To ameliorate some of the conflict the VAST trail was moved to the road above the first switchback, which separates uses on the lower section of road which is also quite popular for sledding. As popularity increases, some sledders and skiers are going further up the road and using portions of the groomed VAST trail. Despite frequent efforts at maintaining signing, VAST information, direction and warning signs have been repeatedly stolen or vandalized. In 2017, a second gate was installed farther up the road in an effort to further separate uses.

f. Winter Recreation – Winter recreation at Mt. Philo State Park is varied. In addition to snowmobiling, it includes snowshoeing, winter hiking, sledding, snowboarding and cross-country skiing. MPSP can become a very busy place on winter days as visitors try to take advantage of limited conditions. It should be noted there is no paid staff on site between mid-October and mid-May to manage this use.

g. Parking – There are two designated parking areas that serve MPSP. The paved lot at the summit, originally constructed by the Civilian Conservation Corps, has a 35-vehicle capacity. This parking lot is only available to vehicles during the park operating day and season. The gravel-surfaced lot at the base of the mountain just inside the park entrance was built in the 1990s and has a 66-vehicle capacity. This parking lot is open year-round. Capacity is often exceeded during nice weather, particularly weekends and holidays. Fees are charged when the park facilities are open. When parking capacity is exceeded visitors often park in unauthorized areas on the lawn and along the town road. This results in resource impacts and safety issues. The parking lot was built to the maximum size permittable. Vandalism and theft are problems particularly in the off-season when the park is not staffed. The department has no dedicated law enforcement on staff. FPR has relied on visitor information and signs; along with partnerships with local and state enforcement agencies for assistance.

h. Hunting, Fishing, and Trapping – These activities are permitted on all state land unless otherwise designated. These activities are prohibited in developed portions of the state park during the operating season. Mt. Philo State Park offers small and perhaps some large game hunting opportunities. Fishing is not viable since there are no permanent streams that support fish.

   The actual pursuit of fish and wildlife is governed by rules and regulations established by the Vermont Fish and Wildlife Board. Fish and wildlife commercial uses are limited to those specified in the existing Fish and Wildlife Department regulations. The State Park is within Wildlife Management Unit (WMU) F1. WMUs are administrative entities based on physiographic characteristics that help to shape species management in the state.

   No firearms, or bow and arrows, except by special permit shall be discharged in any developed recreation area during park operation season. No firearm shall be discharged within 500 feet of any occupied building or structure in any park or recreation area.

i. Birding, Wildlife Viewing, and Nature Appreciation – Bird watching and nature appreciation opportunities are popular at Mt. Philo State Park. Visitors can experience forested landscapes, open fields, beautiful sunsets and expansive views. Wildlife on the state park includes songbirds, invertebrate species, raptors, small mammals and the occasional large mammals and reptiles. MPSP is perhaps best-known for its vantage to view the annual fall hawk migration through the Champlain Valley.

j. Camping – The small camping area at MPSP, with just ten sites is located on the northeast slope of the mountain. The sites consist of three lean-tos and seven tent areas. There are full restroom facilities. The camping season is from late May through Columbus Day weekend. While still underutilized, use of the campground has increased 10% in the past two years. This use is often associated with events.

k. Rock Climbing, Bouldering, Scrambling – While not widely practiced at MPSP, the cliff communities within the park have suffered from these activities, particularly scrambling. Destruction of fragile vegetation and rare plants and a marked increase in erosion on the scramble routes have damaged these fragile areas. Since this is not a prime location for these activities, efforts should be made to stop off-trail use that contributes to this impact. Relocating the lower portion of the Summit Trail and designating the cliff communities as Highly Sensitive are efforts to help protect this area.

l. Education and Outreach – Education and outreach efforts provide park visitors with information in which to better understand the diversity of natural resources and the many noncommercial recreation opportunities available; while also understanding user responsibilities (i.e. hiker ethic, rules & regulations). There is also the opportunity to advance knowledge and understanding about management activities, appropriate uses, and department mission and responsibilities. There are a number of ways to achieve this. Posting information on kiosks, websites, social media and in brochures are effective. However, this information is perhaps more effectively conveyed with educational interactions between department staff and park visitors through one-on-one conversations or park interpretive programs. Education is also accomplished by demonstrating and signing management activities such as high-quality trail management practices, invasive species treatments and forest management operations.

Table 10: Roads and Trails at Mt. Philo State Park

Trail Name	Location	Trail type	Trail/tread type condition	Uses
House Rock Trail 0.4 miles	Lower parking lot to intersection with park "down" road.	3-4-foot wide, forested	Variable - natural surface with rocks, ledge. Some areas of stone steps, wooden stairs, crib ladders and some surfacing with stone. Widening continues due to group size, use in wet weather & by-passing structures. Social trails are an ongoing issue.	Hiking
Trail goals – maintain trail on sustainable grade with enough structures and trail surfacing to facilitate hiking while protecting the natural environment (soil, erosion, slippery clay soils), especially when wet; widen trail to approximately 4 feet where feasible to accommodate numbers of hikers and protect the surrounding forest and vegetation. Consider use of barriers, structures & trail closures (mud) where appropriate.				
Summit Trail 0.25 miles	From park "down" road at end of House Rock Trail to summit (view)	3-4-foot wide, forested	Natural surface, few stone structures. Narrow in places, ledge, steep. Trail is in poor condition with eroding soils, poor tread condition, limited options for upgrade in current location. Cutting switchbacks & off-trail use is causing soil loss & erosion at increasing rate. Trail sits just above Devil's Chair Trail & some hikers are trying to connect the two by scrambling up the steep bank. Trail upgrade difficult in current location. Relocate improperly sited sections of trail.	hiking
Trail goals – creating a sustainable trail in this location is difficult and expensive and would require extensive altering of the natural setting. Relocating it to a sustainable grade, traversing the slope, would result in a more physically and ecologically sustainable trail and safer location - an alternate location where soil is deeper and trail construction and maintenance more sustainable. The relocated trail will intersect the House Rock trail at the 'down road' crossing and follow along a hardwood bowl traversing the contour until it intersects with the Campground Trail. It would then continue to its intersection with the upper part of the Summit Trail. The old trail location will need to be completely restored. New location would add approximately 300 feet to the total length.				
Devil's Chair Trail 0.3 miles	Intersection of House Rock & Summit trails to park 'up' road – does not reach summit.	2-feet wide, forested	Natural surface, follows below cliffs, some narrow spots. Options for sustainable upgrade of trail are unrealistic. Soil loss, erosion & trampling rare plants at increasing rates. Signs & brushing in of 'social trails' unsuccessful.	hiking
Trail goals – add a few structures (stairs, crib ladder) in limited locations to reduce erosion. Reconstruct some sections of tread to improve hikability and keep hikers on the trail. 'Advertise' this trail as an alternative hike at Mt. Philo – through beautiful forests, with huge cliffs, but one that does not reach the summit. It might also be attractive as a less crowded trail. This trail cannot support high numbers of hikers. Close trail and restore site if off-trail use cannot be contained and damage continues to natural communities, rare plants, soil health, and trail infrastructure.				

Trail Name	Location	Trail type	Trail/tread type condition	Uses
Old Carriage Road Trail 0.2 miles	summit (south of vista) to 'up' road	Old road, 12' wide	Natural surface, some grade but gentle, overviews of Champlain Valley. Some erosion of surface on portions with increased grade. Consider surfacing & erosion control structures.	Hiking
Trail goals – Repair surface to control and prevent erosion. Consider hardening surface to make more accessible. Install signing to 'advertise' hiking opportunities.				
Campground Trail 0.3 miles	Campground to Summit Trail and upper parking	2-3 feet wide, forested	Natural surface, some grade Some erosion	Hiking
Trail goals – connect relocated portion of Summit Trail to this trail as alternative route to the top. Improve tread and erosion control along entire length of trail. Widen trail to 4 feet over time to support increase in hiker use.				
Park Road – 3 season	Park entrance to upper parking lot & return	Road	Paved surface, steep, main loop is one-way ('up' and 'down' roads)	Vehicle, bike, walking
Trail goals – maintain as option for walking to summit. close off social/off-trail areas to protect resource. Install history interp signs in designated locations where hikers can be off the road surface while reading.				
Park Road – winter	Park entrance to upper parking lot & return	Road	Paved, unplowed – part of this road is also a VAST trail; lower part (below first turn) is used for sledding	Snowshoeing, walking, xc skiing, sledding (lower), snowmobiling (VAST trail only)
Trail goals – maintain signs, separate incompatible uses, as necessary.				
VAST Trail 1.6 miles	Town road through park (along road) and off state land to the east. Side trail to summit.	Road	Paved, unplowed in winter	Snowmobiling, cross-country skiing, snowshoeing
Trail goals – maintain trail. Install and maintain appropriate signage.				

Effects of High Use to Be Monitored and Managed at MPSP:

a. *Physical capacity*: Physical capacity refers to the capability of these lands to physically accommodate recreational and other forms of public use.
b. *Social Effects*: Social effects refer to the extent to which the enjoyment of a recreational activity is affected by increased numbers of users or interactions with those participating in other recreational activities in the same vicinity.
c. *Ecological Effects*: Ecological effects refer to the extent to which public use is compatible with maintaining the ecological resources and integrity.
d. *Effects on Public Safety*: Effects on public safety include situations where increases in the number of recreational users, introduction of new types of recreational use, or concentrating uses in certain areas may increase the potential for recreational users or others in the area to experience physical harm.
e. *Interactions with Other Non-Recreational Uses*: Recreational use has the potential to cause conflicts with other legitimate uses of these lands. Other uses include wildlife and timber management.

Specific Management Considerations and Current Needs:

The program of trail maintenance at MPSP includes assessment and monitoring on a regular basis. This work includes an inventory of trail features, evaluation of trail conditions, identification of trail management and maintenance needs, evaluation of signage and trail marking, and identification of hazards. Trail assessment is both formal and informal as the trail is hiked several times per year. This process is used to inform trail maintenance and project prioritization.

Trail Infrastructure:

- Trail Surfaces - Some sections of trail have an expanding area of impact up to 10-feet wide or more in places. Hikers and larger groups walking side by side rather than single file, stepping off trail to pass or let others pass, and walking with dogs contribute to this impact. Hiking in poor trail conditions (wet, icy) force hikers to walk on trail edges, trampling vegetation, to find secure footing has also led to widening of the trails over time.
- Trail Maintenance – Soil displacement caused by a high volume of foot traffic on the trails contribute to the surface wear, erosion, soil compaction, failed erosion control structures (walking around waterbars), and wear and failure of trail structures (walking around staircases) has led to a need for structure repair and rebuild on a more frequent schedule.
- Social Trails – There is evidence that some hikers are creating unauthorized trails, shortcuts, cutting switchbacks, and dispersing off-trail. This use leads to greater resource impacts and area of disturbance.

Wildlife, Forest and Natural Community Resources:

- Rare, Threatened and Endangered Species - There is evidence of trampled, damaged or destroyed vegetation due to trail widening and expansion of social trails into unauthorized areas. Some populations have been lost.

- Soils – Short-cutting switchbacks is an increasing contributor to soil and vegetation loss, especially on steep terrain on the Summit Trail and the cliffs above Devil's Chair Trail. Short-cutting creates disturbance, kills vegetation and generally creates a path straight downhill (fall line) and facilitates erosion.
- Wildlife – There is a large body of research related to the impact of dogs on wildlife. Wildlife observations at MPSP are few suggesting that impacts may be occurring here.
- Invasive species – Expanding areas of disturbance, soil disturbance associated with widening trails, trampled vegetation and seed dispersal (dogs, boots) can contribute to an increase introduction and spread of invasive species.
- Site contamination and litter - Increasing amounts of dog waste left behind pollutes soil and can contribute to poor aesthetic experience (smell, sight).

Recreation Experience Impacts

- School and Tour group numbers – There is a growing visitation from large groups (tour buses, school groups). Some days several buses make their way to MPSP adding 100's of hikers to the trail at one time.
- Dog interactions and waste – Increasing reports and incidents with dogs (dogs-people interactions, dog-dog interactions), and increased dog waste (including bagged) found along road and trails.
- Vandalism – Increased reports of vandalism at trailhead parking.
- Area of impact – Expanding area of impact at summit as result of visitors looking for picnic space on days of high visitation (crowded, compacted soils, loss of vegetation/turf).

Facilities Impacts

- High visitor numbers – The numbers from trail counters, park entrance fees and campsite occupancy reveals the increasing visitation at MPSP.
- Parking lot capacity – Parking lot is full and overflowing onto lawn and road sides on many nice days, holidays, and weekends exceeding permitted capacity, creating unsafe conditions, and expanding areas of impact.
- Facility capacity – Composting toilets cannot meet demand; water system failure requires water to be trucked in for park operation. A new waterline planned should help alleviate some of the water supply problem.

3. Recreation Opportunity Spectrum Results (ROS): The United States Forest Service (USFS) Recreational Opportunity Spectrum serves as a guide to describe the character of the recreational experience on public land. ROS analysis of Mt. Philo State Park reveal seasonal differences. Generally, and certainly on busier days with high visitation, the experience at MPSP can be described as *developed natural*. This term describes a modified landscape where sights and sounds of people are readily evident, interaction between users is moderate to high, and encounters with other individuals and groups is

common. In this ROS category trail and road density is moderate. This describes the experience in an area that is considered a substantially modified natural environment, one where resource modifications and utilization practices enhance recreation activities and that maintain vegetative cover and soils. Sights and sounds of people are readily evident. This is particularly true at the summit.

There are still areas within MPSP, and times of the day or year, where the experience is better described as *semi-developed natural*, a term used to describe more natural appearing landscapes with human-influenced modifications that are generally perceived as background by most people. Experiences in these areas are described as having low user interaction. There is overlap between the two categories. Both describe frequency of contact as moderate to high on roads and low to moderate on trails and away from roads. These ROS descriptions also recognize that contact frequency varies with location, day, season and weather conditions, recognizing that peak days may exceed typical limits.

Visitor carrying capacity is defined as *the type and level of visitor use that can be accommodated while sustaining acceptable resource and social conditions that complement the purpose of the land base.* It is intended to safeguard the quality of both the resource (natural, aesthetic, cultural) and the visitor experience, which is often linked to those resources. It is primarily a prescription of resource and social conditions and secondarily a prescription for the appropriate number of people. (ROS implementation guide, March 2001).

4. Management Considerations:
    - Determine how to strike the balance between protecting the natural resources and providing a high-quality trail system. Focus management toward providing an excellent hiking trail and high-quality recreation experience within a natural setting and resilient forest.
    - Prioritize increased need for higher level trail construction and maintenance to protect the environment and trail infrastructure. Create sustainable trails by using techniques including trail widening, surface hardening (gravel, stairs, stone tread), and relocation of poorly situated trail segments. Retain the remote feel of a forest trail as much as possible.
    - Address issues presented by high visitor use in relation to protection of natural resources, hiking infrastructure, park facilities and visitor experience. Use strategies to reduce the number of users on trails at any given time (i.e. group size, number of events, number of school groups, types of events).
    - Develop and post/distribute trail ethic and educational materials (i.e. educational materials related to hiking in muddy, wet, and icy conditions, responsible dog control).
    - Resolve winter use conflicts due to increased interaction between uses and user groups; based on increasing number of users; incompatibility of uses; and motorized versus non-motorized use.
    - Address growing dog related conflicts resulting from dogs off-leash, dog waste, dog-wildlife encounters, ineffectiveness of current system of leash enforcement, negative

dog-dog interactions, and negative dog-people interactions. Require dogs to be on least at all times. Consider the possibility of more consequences for not following rules or for repeated offenses.

- Find solutions to negative impacts on trail infrastructure. Some examples of these include trail widening, increased soil erosion, growing number of social trails and off-trail use, cutting switchbacks/ taking shortcuts, increase need for maintenance, and destruction of trailside vegetation.
- Address parking capacity limit which is exceeded on nice weather, weekends, and holidays or when large groups are present. Currently visitors park on the lawn, in the field, and along town roads, resulting in dangerous conditions and habitat impact. Close parking when full. Don't park cars on lawn. Consider adding lines to surface so that vehicles use less space when parking.
- Management recommendations need to consider facility capacity (i.e. toilets can't support amount of use and are not functioning/open at summit in winter, water well capacity not adequate).
- Address staffing needs. Current levels of staffing and length of operating season are not adequate to meet needs of high visitation (i.e. rule enforcement, education & interpretation, providing service). Evaluate strategies to improve state park services including additional staffing for operations, interpretation, and rule enforcement (including year-round), and expansion of hours and operating season.
- Identify and support similar recreation opportunities nearby (i.e. hiking, day use) to lessen impact at Mt. Philo and to spread recreational use over a broader landscape. Partner with the Town of Charlotte to advertise town trails.
- Designate mowed path to north slope as North Vista Trail, incorporate road along northern boundary into trail system as North Trail. Conduct necessary trail maintenance and construction to support hiking.
- Close parking when full. Don't park cars on lawn. Consider adding lines to surface so that vehicles use less space when parking.

Figure 9: Recreation Map

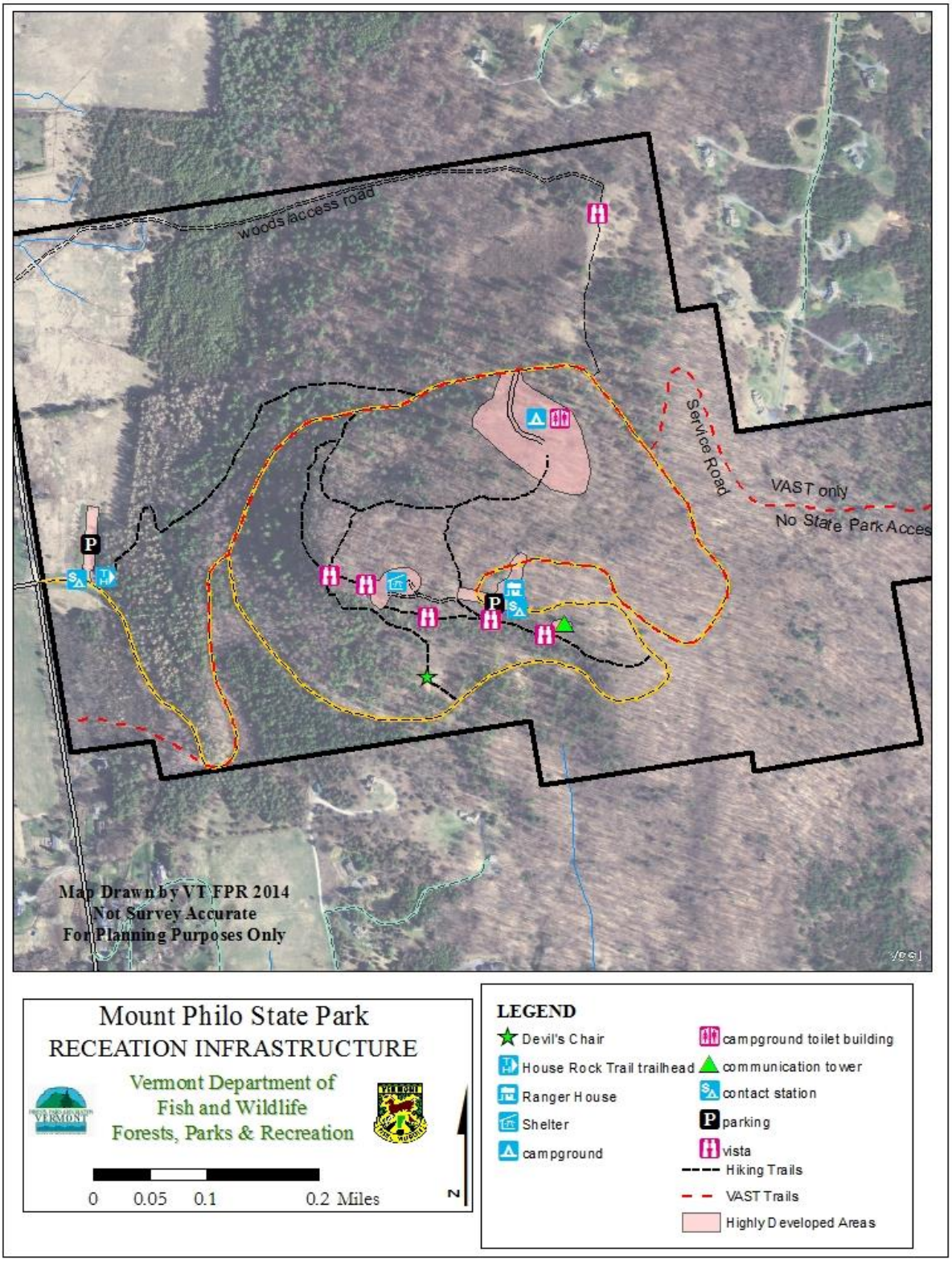
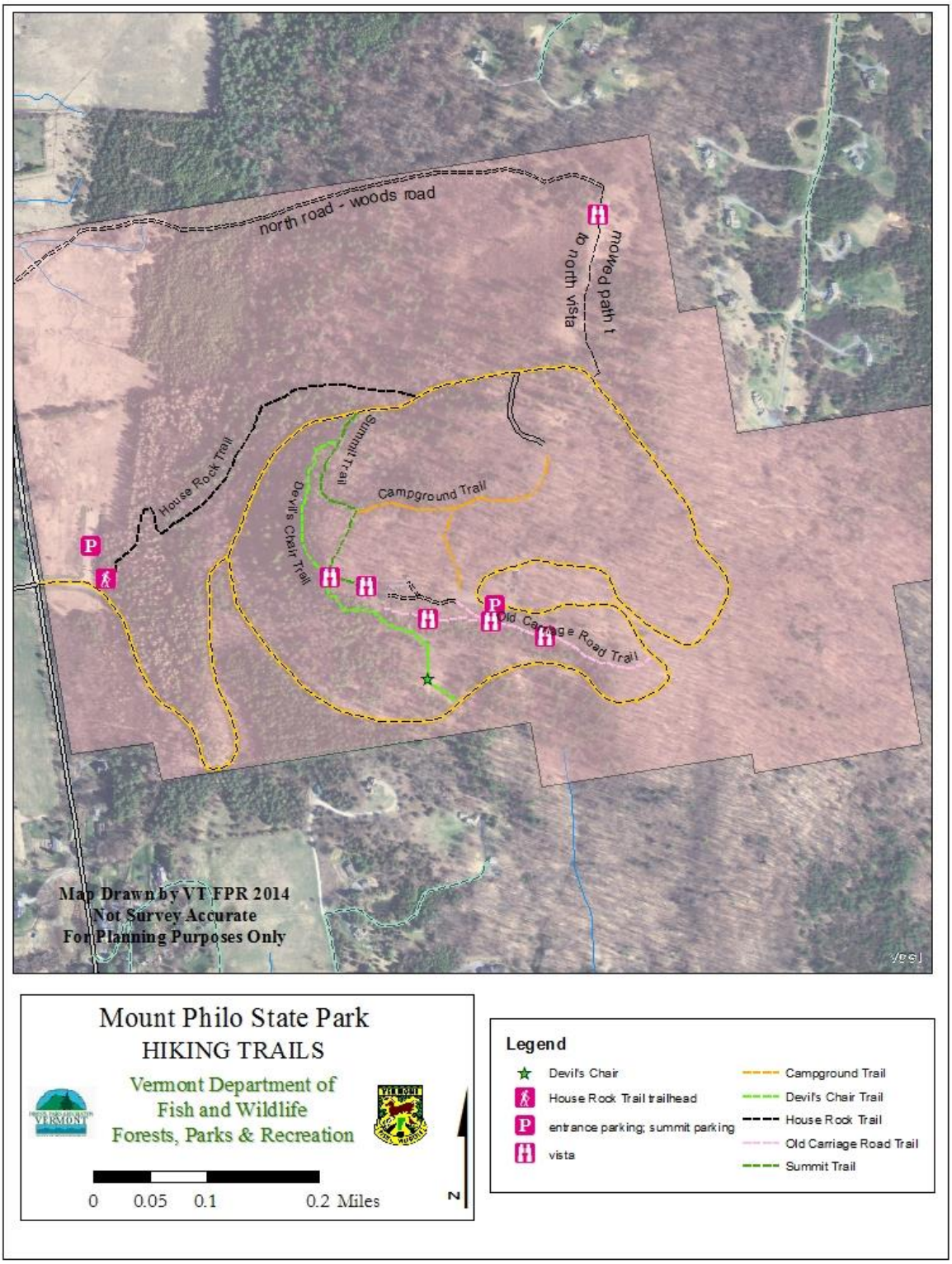


Figure 10: Trail Map



I. Road Infrastructure and Public Access Assessment

1. Description: MPSP is located at the intersection of State Park (TH #5) and Mt. Philo (TH #35) roads. Access to the state park is via the park entrance road at that intersection of town roads.

2. Existing Conditions: Park facilities are open and staffed between May and October and park entrance and camping fees are charged. From November until mid-May, the facilities are not operating, the park is not staffed, and the road to the summit gated. The lower parking lot remains accessible year-round and hiking trails and park road system are available for hiking, walking, etc.

   In addition to the far-reaching effects on ecological systems, climate change may also effect the infrastructure and public uses on MPSP. Potential effects could include:

   - Floods damaging roads, trails, and facilities.
   - Fires endangering users, campground and park properties, and neighboring properties.
   - Increased precipitation leading to more temporary/seasonal road closures and increased road maintenance.
   - Shorter winters reducing winter use seasons.
   - Windstorms increasing maintenance needs to keep roads clear of trees.

   Such effects will be addressed on a case-by-case basis. It is anticipated that the systems in place to manage many of these uses will readily handle these issues. Others will require more comprehensive considerations, for example, increased precipitation and flooding – maintaining MPSP as extensively forested is a key strategy to reduce and mitigate flooding downstream. In addition, ANR has and will continue to replace undersized culverts (which can fail in flood events) with larger and better positioned structures.

   Roads: Mt. Philo State Park is served by a paved loop vehicle access road to the summit for day-use and camping during the park operating season from mid-May until mid-October. Because of the terrain, the park road is steep, narrow, and not maintained in winter (late fall through spring) when it can be icy and snow covered. Road maintenance is exacerbated by increased number of storm events especially those fast-moving, short duration storms with a lot of precipitation. Several woods roads exist within the park and are used for forest management, maintenance access and recreation (VAST trail). Regular maintenance must include measures to address stormwater runoff.

   Buildings/structures:
   Buildings associated with the operation of the state park include contact stations (entrance and summit), picnic shelter, composting toilets, ranger house and maintenance garage. The campground facilities include lean-tos and toilet buildings. Most originated with early park development and the Civilian Conservation Corps. Portable toilets are in place in the lower parking lot year-round. Compost toilets do not function in winter and struggle with capacity issues in season. The developed area at the summit includes a large open area. Much of the area is grass-covered. Keeping turf in place is challenging due to high visitor use, associated

soil compaction and precipitation events. Run-off from this developed area contributes to erosion-related issues on site and on the upper portions of the Summit Trail. Priority should be given to developing a sustainable landscape solution for the summit to address erosion, spread of invasive species, and flow of water coming off the high use area and mitigating impacts to sensitive areas downslope.

Infrastructure Summary

Access, Management & Public State Forest Highways and Roads

Road	Class	Condition	Length	Uses	Needs
Park Access Road	B	Good	2.1 mi.	Seasonal public access to summit parking, picnic and camping areas.	Steep grade; narrow, paved. Culvert and ditch maintenance.
North Road	C	Good	0.7 mi.	Forest management, foot travel.	Periodic maintenance of drainage.
East Road	C	Good	0.1 mi.	Forest management, foot travel.	Periodic maintenance of drainage.

*Class B Road: A paved or unpaved state forest highway that is generally open for public vehicle use but may be closed at certain times of the year to restrict such access.

**Class C Road: An unpaved state forest highway not generally open for public vehicle use.

Gates

Location	Condition	Status	Needs
Entrance Gate	Good	Open during park operating day and season. Closed at night and mid-October through mid-May.	Periodic painting.
North Gate - *proposed*	New	Closed, open for management only	To be installed

Kiosks

Location	Condition	Status	Needs
Entrance trailhead	Good	New panels to be developed	New panel

Signs

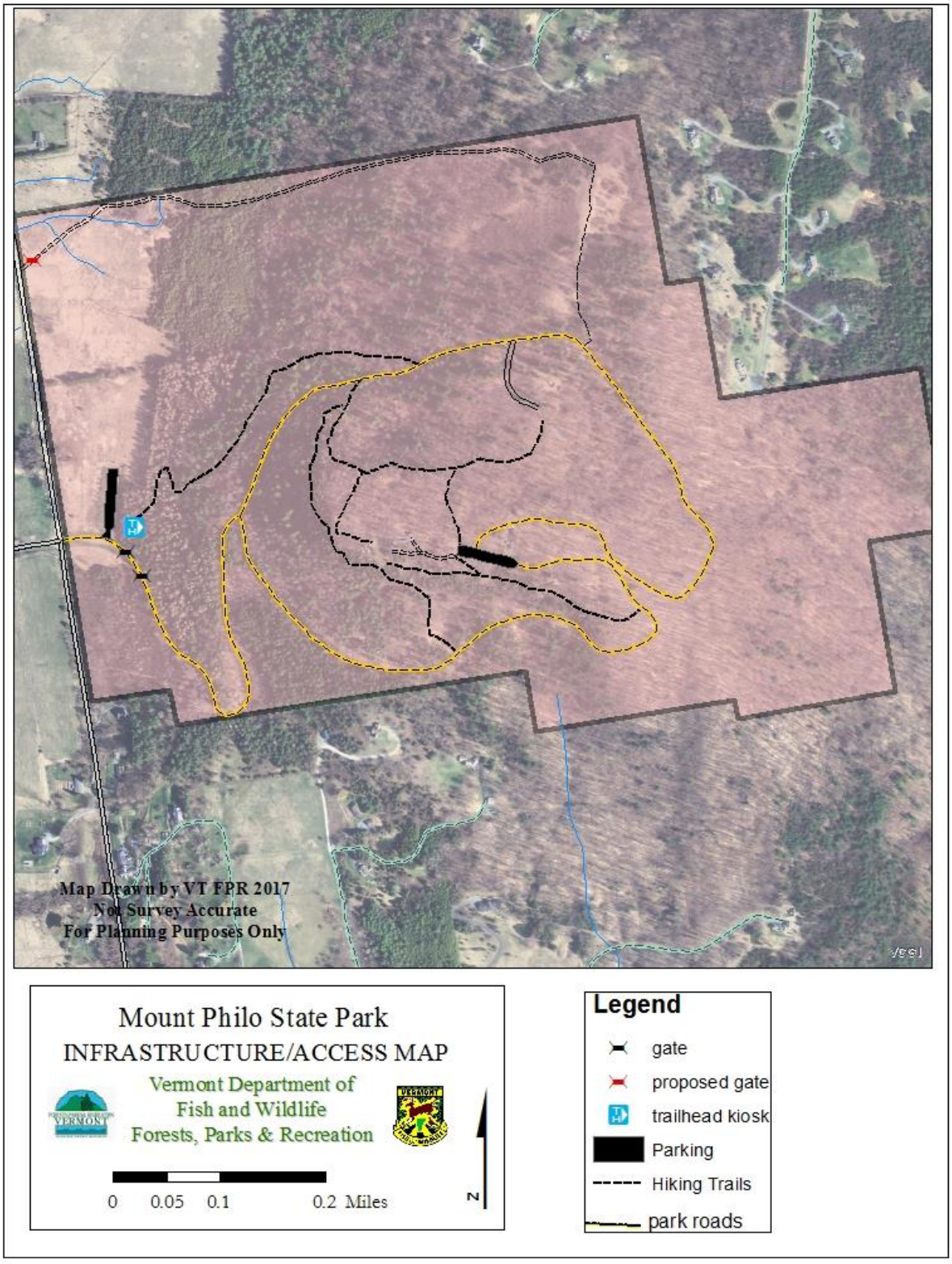
Location	Condition	Status	Needs
Lower parking lot	Good	Park entrance sign	Periodic painting
Various	Good	Trail signs	Periodic maintenance or replacement

Culverts and Bridges: Every road has culverts. Most serve as ditch relief. There are few streams on MPSP and no roads include major stream crossings that would require large culverts or bridges. Regular maintenance includes evaluation of culvert size and capacity and replacing undersized structures.

Parking Areas: There are two designated parking areas that serve MPSP. The paved lot at the summit, originally constructed in the 1930s by the Civilian Conservation Corps has a 35-car capacity. This parking lot is only available to vehicles during the park operating day and

season. The gravel-surfaced parking lot at the base of the mountain was built in the late 1990s and has a 66-car capacity. This parking lot is open year-round. Capacity is often exceeded during nice days, particularly weekends. Parking overflows onto lawns and sides of town roads representing a facility carrying capacity issue. Fees are charged when park facilities are open. Some vandalism has occurred particularly when park is not staffed. Parking areas will not be expanded and will be limited to already designated areas. Parking along town roads will be discouraged with enforcement through a partnership with town and law enforcement agencies. Fields that have been used for overflow parking will be managed as wildlife habitat, for songbirds, reptiles and pollinators. No parking will be allowed in fields.

Figure 11: Infrastructure and Public Access Map



J. Scenic Assessment

1. Description: Mt. Philo is a high point in the Champlain Valley. As such, the view of Mt. Philo is visible from many points in the local landscape. The summit of Mt. Philo also serves as an important vantage point for views of the surrounding Champlain Valley with a mix of residential, rural and agricultural scenes. In the distance, views of the Adirondack Mountains dominate the view shed to the west. These views are an important part of the recreational experience. For many park visitors high quality scenery, especially scenery with natural-appearing landscapes, enhances people's lives and benefits society.[3] Scenery can be assessed at different scales (regional, local, parcel).

2. Existing Conditions: Regionally-significant scenic resources occur from and of Mt. Philo (table 10).

Table 11: Scenic Resources of Mt. Philo State Park

Feature	Location	Vantage Point	Description	Visual Significance*
Mt. Philo	Mt. Philo State Park	Surrounding landscape. Dominant feature in regional, Champlain Valley landscape.	High point on regional landscape. Forested.	Regional
Champlain Valley & Adirondack mountains	Area surrounding the state park	Mt. Philo	View of Champlain valley (rural, ag) and Adirondack Mountains.	Significant for visitors to the summit
Hillsides	All slopes	Route 7 and town roads	Hardwood and mixed forest	local

**Regional*	A significant scenic resource known and appreciated at a broad geographic sale (often geologic land form), typically unique, prominent and visible by a large number of people.
Local	A scenic resource visible from off site that may be geologic but can also be subjectively attractive rural and/or forest vistas.
Parcel	A scenic resource visible from only within or just adjacent to the parcel such as maintained meadows, historic sites, and unique geological features.

3. Management Considerations:
   - Regularly maintain meadow to manage invasive species and maintain native flowering plants and shrubs.
   - Scenic locations where forest management will occur are suited to all-aged strategies that limit the size of canopy gaps in harvest layout.
   - Manage slash from trail maintenance by lopping adjacent to trails. Provide education to hikers on importance of woody material on forest floor for wildlife habitat, soil protection and nutrient cycling.

[3] USFS Handbook #701, Landscape Aesthetics – A Handbook for Scenery Management

IV. MANAGEMENT STRATEGIES AND ACTIONS

Land Management Classification

Vermont ANR lands are managed using four categories of use or types of management to be emphasized on the land. In this section of the plan, the recommended levels of use or types of management will be shown for all the land area in this parcel. This section also describes generally how the land will be managed so that the activities occurring on the land are compatible with the category assigned. The four categories are: (1) *Highly Sensitive Management*; (2) *Special Management*; (3) *General Management*; and (4) *Intensive Management*.

As part of the planning process, the lands, resources, and facilities held by the ANR are evaluated and assigned to the appropriate land management category. Assignment of management categories for Mt. Philo State Park is based on a thorough understanding of the resources identified and the application of over-arching lands management standards. The resources include natural communities, plants, and wildlife as well as recreation, historic, timber, and water resources.

1.0) Highly Sensitive Management – Areas designated as Highly Sensitive Management are described as ***"areas with uncommon or outstanding biological, ecological, geological, scenic, cultural, or historical significance…"*** Acres managed under this category will have no timber management, salvage harvest, or active wildlife habitat management. However, trees and other vegetation may be cut to restore natural community species composition and structure in limited locations; manage specific habitat conditions for rare, threatened, and endangered species; and to maintain safe and enjoyable recreational conditions.

2.0) Special Management – Areas designated as Special Management include areas ***"…where protection and/or enhancement of those resources is an important consideration for management."*** Timber harvesting and wildlife habitat management as well as recreation are considered to be complementary uses within this classification to the extent that they do not impact special features.

3.0) General Management – The General Management category includes areas where ***"dominant uses include vegetation management for timber and wildlife habitat, concentrated trail networks, and dispersed recreation…"*** A primary consideration for management is minimizing conflict between activities. Sensitive resources that occur within these areas may require special attention.

4.0) Intensive Management – The Intensive Management category is characterized by a ***"high level of human activity and high intensity development on/or adjacent to State land."*** Aesthetics and safety are the primary management considerations in these areas. However, more sensitive resources that occur within these areas may require special attention.

The following section contains overall goals and objectives for long-term management at Mt. Philo State Park and then organizes management strategies and actions by land management classification. While most provide long-range guidance, some short-term considerations are necessary to begin to shape this management. Those are listed in call-out boxes where applicable.

The subsequent pages organize the management of Mt. Philo State Park by land management classification; first describing management goals and objectives by broad management category and then providing more detail by subcategory specific to locations within the state park. Some goals and objectives are very site specific, many are overlapping and some apply to the entire property.

VISION STATEMENT

The healthy forests and spectacular views of Mt. Philo State Park provide a valued setting for high quality, well-managed, hiking-focused, recreational experiences that are consistent with the mission of the Department of Forests, Parks& Recreation; are ecologically and physically sustainable; and engender a strong sense of stewardship among visitors. It provides a location where responsible and ethical recreational use does not degrade the natural communities and their associated forests, plants and wildlife; where water and soil resources are protected; and where interpretation of natural and historic resources provides the visitor with a greater understanding and appreciation of Mt Philo State Park and the natural landscape of Vermont.

Overarching Management Goals and Objectives for: Mt. Philo State Park

Rare Species Conservation Goals and Objectives: *Protect rare, threatened and endangered species and their habitat.*

- Prioritize management of invasive species that pose a threat to native rare, threatened and endangered species.
- Enhance habitat for rare, threatened and endangered species where appropriate.
- Support survey efforts to identify and map the extent of rare, threatened and endangered species within the state park including songbirds and pollinators.
- Conduct bat acoustic monitoring surveys to determine species presence particularly where management activities impact bat habitat.
- Manage trail and park infrastructure and public use to reduce impact to rare, threatened and endangered species. Reroute roads and trails as needed.
- Minimize harvesting or other disturbances in vicinity of sensitive species.
- Educate visitors so that they can assist efforts to protect rare, threatened and endangered species.
- Maintain meadow/shrubland habitat for songbirds, bumblebees, monarch butterflies and other pollinators, including rare and uncommon species.

Natural Community Goals and Objectives: *Maintain or enhance natural community quality and native species composition.*

- Maintain high quality examples of natural communities by promoting a natural diversity of native species.
- Manage invasive species where possible and practical.

Forest Management Goals and Objectives: *Create and maintain healthy, diverse, and resilient forests with increased adaptation for climate change.*

- Promote native species composition in hardwood forests. Prioritize invasive species management by density of infestation, risk of spread, impact to forest health and quality of surrounding forest.
- Maintain or enhance forest resiliency by implementing climate adaptation strategies.
- Protect soils by minimizing disturbance, controlling erosion and maintaining or enhancing coarse woody material to replenish organic matter, moderate soil temperatures and recycle nutrients. Keep an abundance of dead trees and branches on the forest floor to maintain moisture, soil organisms and nutrient cycling functions, and provide wildlife habitat.
- Maintain a diverse mix of tree species and tree ages.
- Recognizing the importance of a forest block within the Champlain Valley, manage with goal of no net loss of forest land within the state park.
- Manage stressors to the extent possible including invasive species.

Wildlife Habitat Goals and Objectives: *Protect and enhance significant and unique habitat.*

- Maintain or enhance mosaic of forest stands, shrubland and healthy natural communities for their contribution to wildlife habitat including softwood cover and mast.
- Promote a diversity of native species.
- Maintain or enhance occurrence of trees for use by cavity nesting species; as roost trees for bats; and as future source of dead and down materials including live (4-6/acre) and dead (4-6/acre) snags and coarse woody material (50-80 pieces/acre).
- Enhance and encourage large and small, woody material on the forest floor for the critical value of wildlife habitat, nutrient cycling and soil protection (both compaction and erosion prevention), and as an adaptive strategy for climate change.
- Manage invasive species.
- Recognize and encourage community conservation efforts to promote regional landscape connectivity.
- Mitigate impact to wildlife from larger number of visitors and dogs by requiring dogs on leash at all times and maintaining undeveloped portions of the property.

Historic Resources Goals and Objectives: *Protect historic resources.*

- Identify and document historic resources found within the state park as funding available.
- Interpret historic resources especially those related to the Civilian Conservation Corps and early recreational development within the state park where practical and appropriate.
- Conduct appropriate archeological review prior to any ground disturbing management activity.

Recreation Goals and Objectives: *Provide opportunities for high-quality, well-managed, sustainable recreational experiences, particularly hiking, that do not degrade the natural setting at Mt. Philo State Park and are consistent with the mission of the Department of Forests, Parks & Recreation.*

- Maintain healthy and resilient forest for a myriad of values including that as a publicly-valued setting for high quality, responsible and well-managed recreational experiences.
- Continue to support a sustainable amount of natural-resourced based, non-commercial, mission-driven high-quality recreation.

Hiking Trails – *Manage and maintain hiking trails to support sustainable use and a high-quality experience without impact to uncommon and rare species and natural communities and forest health.*

- Provide a sustainable level of well-maintained hiking trails.
- Protect soils and trail surfaces by discouraging trail widening and use of shortcuts.
- Pursue additional trail protection measures to minimize impacts.
- Employ strategies to close hiking trails when needed due to poor conditions (i.e. wet, muddy, icy) regardless of time of year. May include mud season closure or daily/weekly closure due to extended periods of rain.

Short-term Strategies:

- Evaluate and close unauthorized social trails.
- Narrow wide segments of trail to protect trailside vegetation.
- Sign trails and kiosks regarding trails closures under particular conditions – i.e. ice, mud.

High Visitation – *Provide high-quality, sustainable recreational experience while conserving natural resources. Manage use at a level that maintains capacity for individual visitor enjoyment.*

- Address impacts of high visitation on natural resources and recreational experience through careful environmental stewardship, well-built and maintained facilities and consideration for visitor experiences.
- Work with landscape design consultant to develop summit design plan to better address patterns of use, erosion, impact to rare species, storm water runoff, etc.

Short-term Strategies:

- Limit frequency and size of group events
- Take measures to reduce parking pressures associated with group use of park.
- Provide outreach to groups on hiking ethic and group use at Mt. Philo.
- Discontinue fall road rally event.
- Prioritize funding for structural improvements for trail upgrades, summit landscape design, septic capacity and water availability.
- Advertise alternative hikes in the area.
- Evaluate strategies to improve state park services including additional staff for operations, interpretation, and rule enforcement (including year-round), and expansion of park hours and operating season.

Dogs – *Manage dogs on hiking trails and in day-use areas as part of the recreation experience as practical and safe.*

- Manage increasing incidence of unpleasant dog interactions and waste. Reinforce responsible pet ownership.
- Take steps to ensure that park visitors have control over their dogs, follow leash regulations, pick up and remove all waste, and practice acceptable pet/trail ethics with expectation that they will not interact with other dogs, adults or children unless invited.
- Require dogs to be on-leash at all times, both during and outside of park operating season.

Short-term Strategies:

- Pursue rule change to formalize leash requirements.
- Monitor compliance. Evaluate effectiveness of action. Reassess as needed.
- Make recommendations for changes as needed (i.e. consider tickets, banning dogs).
- Install additional dog waste stations.
- Provide additional educational signage regarding remove dog waste.

Parking – *Manage parking at current levels, considered adequate for high-quality recreational experience and natural resource protection at Mt. Philo State Park.*

- Close park when parking is full.
- Optimize current parking capacity.

Short-term Strategies:

- Manage group and event access to park.
- Do not expand parking to lawn, fields or road sides.
- Fund enforcement.
- Monitor as strategies applied.
- Reassess recommendations as needed.

1.0 HIGHLY SENSITIVE MANAGEMENT — 4 acres

Highly Sensitive Management Areas (HSMA) represent approximately 4 acres or 2% of the Mt. Philo State Park.

Highly Sensitive Management Areas on Mt. Philo State Park include:

- Red Maple-Black Ash Seepage Swamp
- Temperate Calcareous Cliff
- Temperate Calcareous Outcrop
- Limestone Bluff Cedar-Pine Forest

Management here is focused on the protection of natural community characteristics and rare and uncommon plants and enhancement of wetland function and habitat.

Recreational use in these areas is related to hiking on designated trails and summit visitation at designated vistas. Trails and open summit areas associated with HSMA will be managed at their current size and scale to protect these rare and uncommon communities and associated species while still permitting recreational use. Rare and uncommon plants within the outcrop community will be protected by moving picnic infrastructure and fencing in some locations. The cliff will be reserved from climbing to protect the area from erosion and damage to vegetation. Efforts will be made to educate hikers and park visitors about the sensitivity of these communities and the protection of rare and uncommon species.

Hiking with dogs is a popular and growing activity at MPSP resulting in both positive and negative interactions. Dogs, particularly off-leash, also impact vegetation and wildlife. Dog interactions, impacts related to experience and dog waste are growing concerns in all areas of the state park lands including trails and open areas at the summit.

Management Goals and Objectives for Highly Sensitive Management Areas:

- Maintain or enhance the quality of natural communities and their suite of native species, including uncommon, rare, threatened and endangered species.
- Assess, map and prioritize management of invasive species especially as they impact rare, threatened and endangered species.
- Manage and maintain hiking trails to support sustainable use at MPSP without impact to uncommon and rare species and natural communities and to support a healthy forest which serves as a publicly-valued setting for high quality hiking experience.

HSM 1.2 – *Seepage Swamp (1 Acre)*
This designation consists of a disturbed example of a ***Red Maple-Black Ash Seepage Swamp***. It is a small example of a common community, however, it is the only substantial wetland community in the state park and, as such, provides important habitat

diversity. The riparian zone surrounding the wetland is important for sediment retention, nutrient control, habitat structure and wildlife movement. Past land use and proliferation of invasive plant species have degraded this community example. Management of invasive species, buffering from adjacent management activities, and the progression of time will improve the quality of this area.

Management Strategies and Actions:

- Manage 50-foot riparian management zone according to *Riparian Management Guidelines for Agency of Natural Resource Lands*.
- Promote native species composition by managing invasive species and considering planting native trees and shrubs.
- Assess populations of invasive species and prioritize management. Prioritize spreading population of oriental bittersweet within and surrounding this community for treatment/removal.
- Minimize ground disturbance.
- Protect wetland from impacts of management on surrounding lands.

HSM 1.5 – *Cliffs (3 Acres)*

Features within this designation include Temperate Calcareous Cliff, Temperate Calcareous Outcrop and Limestone Bluff Cedar-Pine Forest natural communities. The Temperate Calcareous Cliff extends nearly unbroken for a half mile on the western and southern faces of Mount Philo and may be one of the most distinctive features to park visitors. The cliffs support several rare and uncommon plants. Off-trail use including climbing and scrambling, threaten this community and its associated vegetation. Soil and vegetation loss are occurring at an increasing rate as off-trail use accelerates.

The distribution of ***Temperate Calcareous Cliff*** communities are quite limited within the low elevations of the Champlain Valley and as such warrant protection. The increasing popularity of MPSP and its related increase in associated site disturbance has put these communities and the rare species they contain at peril. While not a particularly popular or valued climbing location, the high level of visitation is leading to more impact to the cliffs especially related to *scrambling* – climbing up the crevices of the cliffs. To protect the cliff resource and its rare plants from further degradation this area has been designated as Highly Sensitive and reserved from climbing.

A portion of the Devil's Chair Trail is located at the base of the cliffs. The trail is less popular than the Summit Trail but sees regular use. It is named for the large, chair-like rock near the southern end of the trail. The Devil's Chair Trail does not reach the summit but is hiked for its route along the base of the cliffs, quiet and solitude, and namesake. It is narrow and constructed on a side hill below the cliff and there are no opportunities to sustainably or substantially widen or relocate most sections of this trail or continue it upslope to meet the summit. Further, if the trail were to be reach the summit, increase in use would be expected. This trail, in this location, cannot support or be made to support,

the high use associated with other trails on Mt. Philo. If damage to the natural community, rare and uncommon vegetation and erosion can't be stopped or the trail degrades due to overuse, closure of the trail may become necessary to protect those resources.

Temperate Calcareous Outcrop is found in two locations on top of the cliff band. These locations offer opportunities for great views of the Champlain Valley and as a result are highly visited, heavily disturbed, and sparsely vegetated, and are arguably some of the most popular sites for visitors on the summit of Mt. Philo. There are five rare plants that are known to occur in this community, all are threatened by trampling. There is a non-native stonecrop that is widespread here as well. Lessening impacts related to trampling and invasive species spread is critical to continued survival of rare plants.

Limestone Bluff Cedar-Pine Forest is a rare community found in a small patch above the cliff. A portion of the Summit Trail passes through this area. There are ongoing impacts related to off-trail hikers trampling vegetation and by-passing switchbacks on the steep sections of trail. Soil loss continues to increase in these locations despite efforts to close off these areas. Current efforts to relocate the lower segment of the Summit Trail to a more sustainable location will eliminate the ongoing impact to this community and remove incidence of one trail at top of cliff and another at the bottom and the associated safety concerns.

HSM 1.5 Management Strategies and Actions:

- Maintain or enhance natural community quality and condition by promoting native species composition, controlling soil loss and compaction, and controlling off-trail use and associated trampling of vegetation.
- Support efforts to inventory and monitor rare and uncommon plants. Protect these species by relocating areas of recreation impact (trails, roads, facilities).
- Assess, monitor and prioritize management of invasive species.
- Monitor populations of white stonecrop. Manage as an invasive species where it impacts rare plants.
- Manage and maintain hiking trails to support sustainable use at Mt. Philo without impact to uncommon and rare species and natural communities and to support a healthy forest which serves as a valued setting for a high-quality hiking experience.
- Contain public use to the area of impact already affected at summit associated with outcrops and vistas to protect rare plants, fragile soils, and to preserve the scenic, forested setting sought at MPSP.
- Work with landscape design consultant to develop summit design to better address patterns of use, and to reduce erosion, spread of invasive species, flow of water coming off high-use areas and impact to rare plants.

Short-term Strategies:

- Relocate picnic sites and other areas of human impact away from rare, threatened and endangered species to protect these populations. Consider barricades as necessary.
- Close and sign cliff area to off-trail use, including climbing and scrambling to protect natural community, native species, and to control erosion.
- Manage hiker expectation. Improve signage of Devil's Chair Trail as an alternative to the Summit Trail and so that hikers know that the Devil's Chair Trail does not reach the summit.
- Manage off-trail use including use of signs, fences and barricades as deterrent strategies.
- Educate hikers and park visitors regarding damage caused to rare plants, forest resource and healthy soils by off -trail and off-site use by both people and dogs.

- Close the Devil's Chair trail if off-trail use cannot be contained and damage continues to natural community, rare plants and soil health and trail infrastructure. Restore the site to its natural condition.
- Continue to carefully consider and support strategic trail relocations to suitable and sustainable locations and trail maintenance strategies that continue to support quality hiking while protecting the natural resources at MPSP.
- Provide education (i.e. signs, kiosks, interpretive materials, website) regarding the importance of remaining on trail for the protection of forest vegetation and recreational resources.

2.0 SPECIAL MANAGEMENT — 206 acres

Special Management Areas (SMA) represent approximately 206 acres or 89% of the Mt. Philo State Park.

Special Management Areas on Mt. Philo State Park include:

- Transition Hardwood Limestone Talus Woodland
- Mesic Red Oak-Northern Hardwood Forest
- Mesic Maple-Ash-Hickory-Oak Forest
- Dry Oak-Hickory-Hophornbeam Forest
- Meadow/Shrubland habitat
- Seep

Historic resources can be found throughout much of the developed areas within MPSP. The road to the summit was first constructed in the early 1900s as a means for hikers and horse-drawn

carriages to reach the summit. Gazebos and springs were located along the route and much of the surrounding landscape was open. Little evidence of the gazebos remains. In the 1930s, the Civilian Conservation Corps developed the recreational infrastructure of the park including improvements to the park road. Only one historic stone culvert remains. The early Vermont Forest Service (now the Department of Forests, Parks & Recreation) and the Civilian Conservation Corps (CCC) were responsible for substantial plantings throughout MPSP. Remnants of the original road alignment (where different than current) can be seen.

Primary uses and management of these areas will be to provide critical wildlife habitat, conservation of uncommon natural communities, healthy forests, meadow/shrubland habitat and opportunities for high quality hiking, day-use, camping, and snow-based recreational pursuits.

Management Goals and Objectives for Special Management Areas:

- Maintain or enhance natural community quality and condition by promoting native species composition, controlling soil loss and compaction, and controlling off-trail use and unofficial access points/trails, and associated trampling of vegetation.
- Assess, map and prioritize management of invasive species as practical.
- Maintain critical habitat and healthy and resilient forest and meadow/shrubland habitat.
- Manage high quality hiking trail and recreation resources while meeting the above goals. Manage and maintain hiking trails to support sustainable use at Mt. Philo without impact to uncommon and rare species and natural communities and to support a healthy forest and meadow/shrubland habitat which serves as a setting for high quality hiking experience.
- Manage meadow/shrubland fields to maintain milkweed, goldenrod and other native species beneficial to monarch butterflies and other pollinator species.
- Map, document and interpret historic resources associated with MPSP as financially practical and appropriate.

SMA 2.1 – *Talus Woodland (11 Acres)*

Transition Hardwood Limestone Talus Woodland, an uncommon natural community, is mapped in two locations at MPSP; one below the cliff on the west side of the property, the other on the east side. Characterized by diverse vegetation and mineral enrichment, this natural community provides rocky habitat suitable for a variety of species including small mammals and snakes such as garter, DeKay's brown and ring-necked snakes.

Portions of the House Rock Trail and state park access road are located within this area on the western side of the summit. An additional area mapped as Talus Woodland on the eastern side of the state park is relatively undisturbed.

Management Strategies and Actions:

- Maintain or enhance natural community quality and condition by promoting native species composition, controlling soil loss and compaction, and controlling off-trail use and associated trampling of vegetation.
- Assess, map and prioritize management of invasive species.
- Maintain hiking trail as a high quality, sustainable resource to support use without negative impact to natural community or rare and uncommon species.

Short-term Strategies:

- Focus maintenance on existing trail system. Continue work to repair, maintain and upgrade trail segments using accepted trail standards for high use trails including measures to widen trail, harden trail surfaces and improve structures as needed. Relocate sections of poorly located trail as necessary.
- Close and sign unauthorized, social trails and unofficial access points.

- Maintain park access road surface and drainage structures in current location. Upgrade culvert size as necessary to accommodate greater precipitation events. Keep gated to vehicle use when park is not in operation or when road conditions are poor.

SMA 2.1b – *Mesic Maple Forest (158 Acres)*

This designation includes examples of ***Mesic Maple-Ash-Hickory-Oak Forest***, an uncommon community, that dominates the Mt. Philo landscape covering nearly 70% of MPSP and serving as the matrix community within which all other communities are embedded. Due to the long history of land use and related disturbance within the park, much of the area mapped as this natural community does not currently reflect the expected natural vegetation. Invasive species such as oriental bittersweet, honeysuckle, and buckthorn pose threats to the long-term recovery of the natural community.

Included within this community is an 8-acre area currently dominated by northern white cedar. While natural community describes the expression of vegetation at maturity, forest cover types describe what is currently growing on a site, in this case northern white cedar. The presence of cedar is a function of past land use and is minor component of the forests at MPSP but it dominates this 8-acre stand and is separated out as a distinct cover type.

A woodland seep is mapped within the matrix forest. The seep is small but important if only for the lack of wetlands features at MPSP. This may provide important habitat for red-backed salamanders and might be a source of early-spring herbaceous browse for white-tailed deer.

A four-acre patch of ***Mesic Red Oak-Northern Hardwood Forest*** is found on the northwestern side of the summit. This area, while currently characterized by sugar maple and northern red oak, has had relatively recent harvesting (associated with 1998 ice storm), and is only weakly distinguished from the adjacent Mesic Maple-Ash-Hickory-

Oak Forest and Dry Oak Forest natural communities. As the patch continues to develop over time, it may become apparent that it is better included with one of those community types.

The healthy and diverse forests of MPSP serve as a valued setting for recreational activity – from hiking to sightseeing to picnicking. The value of this location for these recreational pursuits is inextricably tied to the forest. Maintaining a suitable and sustainable level of recreation infrastructure within a healthy forest is what attracts visitors to the park and is guided by the FPR mission. Carefully maintaining a recreation infrastructure that supports this use at MPSP yet doesn't contribute to exponentially increased use to the point of negative impact on the the resource and experience is critical.

Much of the park road system, VAST Trail, and several hiking trails are located within this area. There has been some discussion in the past concerning the location of the VAST Trail in combination with other winter uses on the park access road. Some measures have been taken over years to better accommodate multiple uses in that area. Public comment received during this planning effort spoke to lack of conflict and benefit of having multiple uses in one location as well as the added value of preserving the tranquil area in the northern part of MPSP for quiet recreation.

The park road system serves as vehicle and pedestrian access to the summit during the park operating season. Due to terrain limitations, the road is steep, narrow and not maintained in winter. Park roads are used for the road rally, a car race event, held each fall for many years. The hiking trail crosses the road in places and uses sections of the road in others. The event requires the closure of a very popular park during leaf season. The event is inherently incompatible with the operational model and footprint of Mt. Philo State Park. Significant ongoing complaints have been received. For these reasons, the road rally event will not be permitted after 2017.

The Summit Trail is arguably the most popular trail at the state park providing access to the summit and associated developed areas. Over the past several years' work has been done to improve the location, grade and sustainability of the trail. Future trail work will be targeted at continuing to maintain, upgrade, relocate trail segments, and improve trail features to accommodate the current level of high use while providing a high-quality hiking experience. Facility and infrastructure upgrades to address continued increases in use are not possible, practical or sustainable and based on public comment received as part of this planning process, are not universally supported.

Social trails, unplanned and unauthorized trails created by individuals, and unofficial private state park access points contribute to forest fragmentation, have the potential to endanger rare and uncommon plants and communities, and spread the recreational impact beyond the current footprint. Efforts will continue to actively close these routes through barricades, slash and signage.

Management strategies will focus on sustainably maintaining and managing existing high-quality trail and facility infrastructure rather than expansion.

The eastern side of the state park is relatively undeveloped. A state park service road, water well and winter-use VAST trail are within that portion of MPSP. This area will be maintained as a quiet, non-developed area of "open space".

The presence of dogs at MPSP is increasingly becoming an issue because of interactions between dogs; between people and dogs; dogs off leash; and dog waste not being picked up by owners. There is even an increase in incidents associated with dogs on-leash as they are permitted by their owners to jump on other visitors or interact with other dogs. To protect natural resources, wildlife habitat and the recreational experience of all users', measures (i.e. enforcement, education) will be taken to address these issues by ensuring that people have control over their dogs and that they are on-leash according to state park rules and regulations. If despite these efforts, the problem continues, it may become necessary to prohibit dogs at MPSP.

Evidence of the history of Mt. Philo can be found along the road to the summit and in the developed areas of the park. Some remains of gazebos can be seen from the access road, in fact much of the road, itself is in its historic location.

Management Strategies and Actions:

- Maintain and enhance natural community condition and quality including its suite of native species. Protect rare, threatened, and endangered species.
- Discourage further fragmentation of forests at MPSP. Maintain MPSP at current level of forest cover. Retain and enhance natural resources within park for its value as a forested "island" in a developed landscape. Support local efforts at enhancing regional landscape connectivity.
- Protect undeveloped areas within the park. Do not expand or relocate trails or recreation facilities into these areas.
- Manage large and small coarse woody material (downed wood on forest floor) valuable for wildlife habitat, soil protection, erosion protection, nutrient cycling, and as an element of sustainable forest management. Keep an abundance of dead trees and branches on the forest floor. Maintain natural recruitment where appropriate and safe and consider enhanced recruitment in areas where downed wood is lacking. Interpret the importance of coarse woody material to park visitors.
- Maintain, enhance and manage existing high-quality trail system to support MPSP vision, FPR mission and Vermont State Park mission. Accommodate current, and appropriate, levels of use at Mt. Philo.
- Assess the potential for upgrading some existing trails or trail segments to ADA standards (American's with Disabilities Act) where practical. Trail grades are problematic in achieving these standards in most locations.

- Maintain the east side of the summit as an undeveloped area with no additional trails, other than the existing VAST snowmobile trail.
- End use of park road system for road rally event. This event is inherently incompatible with the operational model for MPSP and closes this high-use park to the public during a time of high visitation.

Short-term Strategies:

- Focus maintenance on existing trail system with the goal of providing an excellent hiking trail and a high-quality experience.
- Continue work to repair, maintain, relocate, and upgrade trail segments using accepted trail standards for high use trails.
- Build and improve trail structures to protect resources, improve experience, and enhance safety. Harden and widen trail surfaces where needed and possible, to lessen impact from high use.
- Close unauthorized, "social" trails including individual trails from private land and residences and to favored locations. Use slash/brush, barricades and signs as necessary.
- Maintain North Vista Trail from park access road, at blue gate, to vista at height of land north of campground (see 3.0 for additional strategies).
- Improve trail intersections and signage. Provide more educational information on trailhead kiosks.
- As a strategy to address high levels of use at Mt. Philo, advertise alternative hikes and hiking locations including other state, municipal, and publicly-accessible private trails (i.e. Kingsland Bay, Niquette Bay, & Round Pond state parks, Colchester Pond, Shelburne Pond, Pease Mountain, Shelburne Falls, Shelburne Farms, Charlotte Town Trails).

- Support Town of Charlotte's efforts to build and promote alternate trails in their community and build and encourage parking for those trails separate and away from Mt. Philo State Park.
- Develop and designate existing road at north boundary of MPSP as an alternate hike to the summit via the North Vista Trail and connections to Summit Trail or park road. Construct short segments to complete connections to existing trails as practical. Develop additional hiking trail in 2.2 to connect to parking area (see 2.2 for additional management strategies and actions).
- Continue to support use of existing VAST trail for snowmobiling under appropriate snow conditions, in its current location, Keeping intensive uses on road. Preserve tranquil areas by leaving proposed North Trail as hiking only. Do not expand use of VAST trail on east side of summit to include hiking. Non-winter use of the road is as state park service road only.

- Maintain state park entrance off Mt. Philo Road as the only entrance into MPSP and manage this eastern area as undeveloped "open space".
- Support VAST's efforts to keep trails posted despite vandalism to signs.
- Close unauthorized trails onto state land.
- Require dogs to be on-leash at all times.
- Timber management is not a primary management goal for MPSP but timber harvesting and salvage operations are tools that will be used to manage forests at MPSP to promote age, structure and species diversity; to maintain forest health; promote climate adaptability; to enhance native species composition and wildlife habitat; and to protect the aesthetic and scenic values that serve as the setting for high quality recreation.
- Consider options of timber management in Norway spruce plantation if stand health deteriorates, trees become less vigorous and crown loss occurs, and tree mortality increases.
- Consider timber harvest in developed areas and campground as option to maintain stand health and vigor and reduce hazard and high-risk trees.
- Use of a salvage operation to remove trees damaged through natural processes (i.e. ice storms, wind events) will be considered for safety of park visitors and staff, enhancement of aesthetic values, and economics (contribution to local economy, funding for storm cleanup).
- Manage large and small coarse woody material (downed wood on forest floor) for its value as wildlife habitat, soil protection and erosion prevention, nutrient cycling, and as an element of sustainable forest management. Keep an abundance of dead trees and branches on forest floor. Maintain natural recruitment where appropriate and safe and consider enhanced recruitment in areas where downed wood is lacking. Interpret importance of coarse woody material for forest health.
- Maintain all state park roads to accepted standards. Evaluate need for gate on northern woods road at its intersection with town road.

SMA 2.1d – *Dry Oak Forest (27 Acres)*

The uncommon ***Dry Oak-Hickory-Hophornbeam Forest*** is found on the summit and southeast slope on warm, dry sites. The oak and hickory provide hard mast for wildlife, especially small mammals. Portions of the park road system at the summit and the trail to the campground are within this area. Now a pedestrian trail, The Old Carriage Road Trail follows the alignment of a portion of an earlier version of the road to the summit. Viewpoints along the trail are in their original location complete with iron railing installed at the turn of the last century.

Management Strategies and Actions:

- Maintain and enhance natural community condition and its suite of native species including rare, threatened, and endangered species.

- Assess, prioritize, and manage invasive species.
- Maintain, enhance and manage existing high-quality trail system to support MPSP vision, FPR and Vermont state park mission and accommodate current, appropriate levels of use at Mt. Philo State Park. Evaluate trail location, condition and sustainability.
- Continue work to repair, maintain, relocate, and upgrade trail segments using accepted trail standards for high use trails.
- Build and improve trail structures to protect resources, improve experience, and enhance safety. Widen trail and harden (i.e. rocks, logs, structures) and stabilize surface where needed, possible and practical to lessen impact from high use.
- Assess potential for upgrading some trails or trail segments to ADA standards (American's with Disability Act) where physically and financially practical. Trail grades may be problematic in most locations.
- Require dogs to be on-leash at all times.
- While timber management is not a primary management goal for MPSP, timber harvesting and salvage operations are tools that can be used to manage forests at MPSP to promote age, structure and species diversity; to maintain forest health; promote climate adaptability; enhance native species composition; enhance wildlife habitat; and protect aesthetics and scenic values that serve as the setting for high quality recreation.
- Manage large and small coarse woody material (downed wood on forest floor) for its value as wildlife habitat, soil protection and erosion prevention, nutrient cycling, and as an element of sustainable forest management. Keep an abundance of dead trees and branches on forest floor. Maintain natural recruitment where appropriate and safe and consider enhanced recruitment in areas where downed wood is lacking. Interpret importance of coarse woody material for forest health.
- Protect, document and interpret historic resources as practical and appropriate.

SMA 2.2 – *Meadow/Shrubland Habitat (21 Acres)*

The forb and shrub-dominated meadow provides important habitat lacking elsewhere within MPSP. This area, north of the park entrance to the northern property boundary and east to the tree line includes small islands and hedgerows of trees, scattered shrubs, grasses, goldenrod and other species. It may appear "messy" to many, but to the wildlife that depend on this habitat, it is filled with structure and diversity. Some portions are wet, particularly at the northern end. This provides important habitat for songbirds, reptiles and amphibians and rare and uncommon pollinators.

There is a component of poison parsnip and other invasive species throughout the meadow, islands and hedgerows. Poison parsnip is particularly troubling as it can not

only quickly spread to dominate the field and degrade the habitat but is also a human health concern.

There are picnic tables adjacent to this area at the edge of the parking lot that provide opportunities for views of this meadow habitat and its wildlife, flowering plants and shrubs as well as the Adirondack Mountains in the distance. The meadow buffers the parking area from the town road and neighboring properties but more importantly provides critical habitat for pollinator and bird species that are disappearing from Vermont and the region.

The primary goal of the land within this designation is to provide habitat. Providing recreational opportunities in the form of wildlife viewing and hiking trails is an important secondary goal.

Management Strategies and Actions:

- Encourage native species and enhance songbird and pollinator habitat.
- Promote diverse abundance of native wildflowers and flowering shrubs in open areas near woodlands including spring ephemerals to support pollinators.
- Maintain or enhance nest site opportunities including small areas of brush and bare ground for pollinators.

Short-term Strategies:

- Create and retain islands of shrubs and trees for structure and as source of singing locations and perches for birds.
- Maintain rubble piles (stone/rocks) in field as snake habitat.
- Implement prescription for management of poison parsnip. Explore viability of mowing regime that includes repeated mowing during growing season timing each to when plants bloom to reduce seed bank (5-year seed bank). Consider timing, technique and scale of mowing in effort to maximize habitat, use high minimum mower height (12-16") to maintain nests, grass tussocks and small topographic features. Manage field in units in multi-year cycle. Consider manual control (pulling or digging) instead of, in combination with, or as follow up, to mowing strategies depending upon size of infestation and size of volunteer crew.

- Continue to explore research for improved management strategies for poison parsnip and other invasive species that currently impact this habitat or may invade in the future. Consider alternative management approaches that include engaging volunteers, additional staff, contractors, and funding.
- Interpret value of meadow/shrubland habitat for pollinators and songbirds. Develop and place interpretive signage along parking and at suitable viewing vantage points. Focus interpretation on pollinators and value of 'messy habitat' and 'why messy is good for wildlife'.

- Develop hiking trail along the western border of the meadow to connect parking lot to trail at north boundary line (see 2.1b). Locate trail along the meadow side of the hedgerow along the town road to minimize impact to meadow habitat. This trail will connect to North Trail and on to North Vista Trail and in combination will offer an alternate route to the summit and contribute to a loop trail system.

3.0 GENERAL MANAGEMENT — 5 acres

General Management areas represent approximately 5 acres or 2% of Mt Philo State Park.

General Management Areas on Mt. Philo State Park include:

- Open area at the height of land to the north of the summit

The open area at the north summit was cleared prior to state ownership. It extends from the maintained open viewing area at the height of land down the slope to the east, north and west resulting in great views of the Champlain Valley to the north and west and some, more limited views, to the east. The portion of the open land below the summit is shrub/brush and dominated by invasive species which were likely released at the time the trees were cut. There are scattered white pine, native hardwoods and apple trees.

The North Vista Trail, a mowed path, is maintained from park road at the blue gate near the campground entrance to the height of land along the ridge. Despite the dominance of invasive species, there is habitat value for songbirds, pollinators (including rare species) and small mammals and the scattered mature trees serve as perches.

Management of this area can support dispersed, quiet recreational use from the vista and trail, opportunities for view shed management and shrubland habitat for a variety of species.

Management Goals and Objectives for General Management Areas:

- Enhance and maintain shrubs and forbs as songbird and pollinator habitat.
- Promote native species.
- Assess, prioritize and manage invasive species where practical.
- Release and prune apple trees as source of mast and pollen.
- Maintain vista with scattered larger trees and shrubland patches. Manage patches for diversity of age and structure and native species.

GMA 3.0 – *Open - northeast (5 Acres)*

A portion of this area at the height of land is maintained through mowing to allow access to views to north, east and west. The area sloping away from the height of land is dominated by shrubs, many of them invasive.

Currently, two picnic tables are provided in the mowed area, one at the upper vista point and another at the lower. No other facilities exist. This is an extremely valuable, undeveloped area that offers a quiet alternative to the developed summit of Mt. Philo. The area is accessed by the North Vista trail (see 2.1b).

While management of the view and area for more quiet recreation is an important goal of this area efforts will also focus on treatment of invasive species and restoration of native shrubland habitat.

Management Strategies and Actions:

- Maintain open area at height of land for scenic views to the west, north and east and as shrubland habitat for birds, pollinators and other species of wildlife.
- Assess, prioritize and manage invasive species as practical.
- Release and prune scattered apple trees as valuable source of soft mast and pollen.
- Maintain this area in its current condition for its views and as a location for quiet, dispersed recreation (unorganized small groups and individual hikers).

Short-term Strategies:

- Do not expand developed facilities.
- Maintain this as quiet space for enjoyment for individual park visitors by not scheduling group or reserved events in this area.

- Continue to maintain access to this area along North Vista Trail (see 2.1b) for hiking and pedestrian access to the view.
- Develop connection from North Vista Trail to North Trail (2.1b) along road at northern boundary and to Campground Trail.

4.0 INTENSIVE MANAGEMENT — 7 acres

Intensive Management Areas (IMA) represent approximately 7 acres or 3% of Mt. Philo State Park.

Intensive Management Areas on Mt. Philo State Park include:

- Campground area.
- Summit Area.
- Communication site at summit.
- Parking.

Primary uses and management these areas are related to the developed recreational infrastructure at MPSP. The size of the area designated as Intensive Management is relatively small, just 7% of

the park, yet it contains the very features that draw so many visitors to Mt. Philo. In addition to the developed park infrastructure (camping, parking), this designation includes the developed picnicking, shelter and summit area. All hiking trails, except for the Devil's Chair Trail, eventually connect hikers to the summit.

This area of the summit serves as the vantage for the very popular viewing of the hawk migration.

Many of the facilities and developed sites within this area were constructed by the Civilian Conservation Corps (CCC) in the 1930s. The buildings, picnic facilities and park staff housing all remain. The two observation towers that were each at the summit for a time in the early to mid-1900s, were also located in this area. Remains of the first tower are gone but footings from its replacement (dismantled in the 1970s) are still in place. The summit itself, was only popular recreationally for 100s of years, but also likely held Native American significance.

Management Goals and Objectives for Intensive Management Areas:

- Maintain natural community condition and species composition. Promote native species.
- Assess, prioritize and manage invasive species as practical.
- Interpret historic and natural resources at Mt. Philo state park for the visiting public as financially practical and appropriate.
- Address impacts of high visitation on natural resources and recreational experience through careful stewardship of natural resource and consideration of visitor experience.

Short-term Strategies:

- Limit frequency and size of group events
- Take measures to reduce parking pressures associated with group use of park.
- Provide outreach to groups on hiking ethic and group use at Mt. Philo.
- Discontinue fall road rally event.
- Prioritize funding for structural improvements for trail upgrades, summit landscape design, septic capacity and water availability.
- Advertise alternative hikes in the area.

IMA 4.2 – *Campground (4 Acres)*

Nestled in the Mesic Maple-Ash-Hickory-Oak Forest on the north slope, the developed campground at Mt. Philo State Park consists of ten sites, including seven tent sites and three lean-tos, toilets, and showers. There are hiking trails that connect the campground with the summit of Mt. Philo and the north vista, just north of the campground access road.

While campsite occupancy has increased over the past several years, most use is associated with events at the park.

Management Strategies and Actions:

- Manage as small campground, appropriate for tenting.
- Maintain existing campground infrastructure.
- Protect and interpret historic Civilian Conservation Corps structures as financially practical and appropriate.

IMA 4.3 – *Developed Summit (2 Acres)*

Lands and facilities under this designation include the developed facilities at the summit, including park staff housing, group shelter, picnic area, composting toilet, summit trailheads and open grass picnic area.

The beautiful views to the west, northwest and south are arguably what draw visitors to MPSP in such high numbers. The summit area is popular with individuals, families, groups and for events. The high use is taxing natural resources, trail infrastructure, and facilities. As use has grown there is increased pressure, pushing the edge of impact further into the forest; to the edges of the cliffs and impacting habitat for rare, threatened and endangered species.

The annual fall hawk migration is another popular draw to the summit. Each September bird watchers are treated to an array of hawks migrating through the Champlain Valley.

The presence of dogs at MPSP are part of the recreational experience for many but becoming an increasing issue because of interactions between dogs; between people and dogs; related to dogs off leash; and due to problems related to increasing dog waste. There is even an increase in incidents with dogs on-leash as they are permitted by their owners to jump on and interact with other visitors and their dogs. To protect natural resources, wildlife habitat and the recreational experience of all users', measures (i.e. enforcement, education) will be taken to address these issues by ensuring that people have control over their dogs and that they are on-leash according to state park rules and regulations. If despite these efforts, the problem continues, it may become necessary to prohibit dogs at MPSP. At some point, FPR may have the resources to employ a zone management approach, creating and enforcing a no-dog area. Currently, that staff capacity does not exist.

Historic features in this area are very closely linked to recreational use. During the 1930s, under the direction of the Vermont Forest Service (now FPR), the Civilian Conservation Corps developed picnic sites, shelter facilities, at the summit as well as the park staff housing. The Old Carriage Road Trail is along one of the early road locations to the summit.

Management Strategies and Actions:

- Protect rare and uncommon species, especially those in the open areas at the summit and on the periphery of the developed area of impact.

- Identify, protect, document and interpret historic features associated with CCC and early recreational development of the state park as financially practical and appropriate.
- Prevent erosion and storm runoff. Design a sustainable landscape solution for summit to address erosion, spread of invasive species and flow of water coming off high use area and impacting sensitive areas downslope and to address patterns of use.
- Contain public use to the area of impact already affected at the summit associated with outcrops and vistas to protect rare plants, fragile soils, and to preserve the scenic, forested setting sought at MPSP.
- Close and restore picnic sites and other areas that impact rare, threatened and endangered species to protect these populations. Consider use of barricades (fencing) as necessary.

Short-term Strategies:
- Limit frequency and size of group events.
- Take measures to reduce parking pressures associated with group use of park.
- Provide outreach to groups on hiking ethic and group use at Mt. Philo State Park.
- Prioritize funding for structural improvements for trails, summit landscape design, septic capacity, and water availability.

- Assess, prioritize and manage invasive species as practical.
- Do not expand developed park facilities.

HSM 4.4 – *Parking Areas (1 Acres)*

There are two designated parking areas that serve Mt. Philo State Park. The paved lot at the summit was originally constructed by the Civilian Conservation Corps. The 35-vehicle parking lot is accessed by the park loop road and is within a short walk of the open summit area and several vistas. It is only accessible by vehicle during park operating day and season. The second parking area is located at the base of the mountain at the park entrance. It was constructed in the late 1990s. Serving as trailhead parking, this gravel-surfaced parking lot has a 66-vehicle capacity and is favored by hikers using the trail system or walking the road to the summit. It is accessible by vehicle both during and outside of the park operating day and season. The parking area was carefully sized and sited to meet town zoning and permit requirements and to not be overly visible from the town road or neighboring properties. There are three porta-lets and a dumpster at the north end of the parking area. Picnic tables are available at the western edge of the parking lot.

Because of increasing popularity and visitor use at MPSP, parking areas is at or above capacity on nice weekend days, fall foliage, and holidays. Large groups, school and tour

buses contribute to parking capacity issues. Parking at the summit is controlled by restricting vehicle access to the summit when the lot is full. The access road to that parking area is gated when the park is not in operation. Parking at the base is more problematic, especially during periods of non-operation when the park is not staffed. Visitors park along the driveway and town roads creating congested and dangerous situations. There are multiple safety problems that arise when visitors park outside of developed areas. Visibility is obscured and drivers can't see oncoming traffic when they pull out into the road, pedestrians (families, children, dogs) unloading vehicles roadside are often in the travel lane, bikes can't be seen, and people walking out from between parked cars are difficult to see. There have been many near misses.

Parking is an indicator for other impacts of high use at MPSP. Parking, when at or below its maximum occupancy, is at a level consistent with a quality recreation experience. Beyond that, bathroom facilities, trails, visitor and dog interactions and the quality of recreational experience degrade. Focusing management on enhancing existing facilities to better meet current demand is appropriate and responsible and will improve visitor satisfaction by enhancing their experience.

Vandalism and theft are problems particularly in the off-season when the park is not staffed. The department has no dedicated law enforcement and has relied on visitor education and partnerships with local and state enforcement agencies for assistance.

Both parking areas have visitor contact stations that are staffed when the park is in operation.

Management Strategies and Actions:

- Maintain parking areas at current size of 101 spaces.
- Allow parking in designated parking areas only. Do not expand parking onto grass or along driveway to accommodate over use. Maintain grass for pollinator and songbird habitat. Do not mow or compact soils.
- Optimize current parking capacity.

Short-term Strategies:

- Manage group and event access and timing.
- Manage parking lot surface to improve parking (i.e. pave, lines) so that full capacity can be achieved.

- Employ strategies to alleviate pressure on parking.

Short-term Strategies:

- Seek funding for additional staffing in order to lengthen hours and season of operation.
- Support efforts of the Town of Charlotte to develop parking for their municipal trail west of Route 7, away from Mt. Philo SP.
- Close parking lots when full (this strategy is currently used in upper lot and in other state parks).
- Conduct outreach highlighting other recreation opportunities (both state parks and local trails) for distribution when MPSP is at capacity.

- Ensure safety of visitors and town highway motorists and bicyclists by eliminating parking along Mt. Philo and State Park Road.

Short-term Strategies:

- Partner with law enforcement and Town of Charlotte to sign town roads as "No Parking".
- Pursue funding for parking enforcement by Vermont State Police.

- Continue to supply portable toilets and garbage facilities at base parking during facilities season
- Plow lower parking lot for winter access.
- Manage invasive species at trail heads and parking areas, especially those that pose a health risk, such as poison parsnip.

HSM 4.5 – *Electronic Communication Site (0.03 Acres)*

A communication tower is located approximately 100 yards southwest of the parking area at the summit, just below the contact station. The tower and building are owned in fee by the Vermont Department of Forests, Parks & Recreation. Antennas and electronic equipment are co-located at this site and are licensed to Vermont Railway, Charlotte Volunteer Fire Department and Ferrisburgh Volunteer Fire Department, Inc. All installation of communication equipment is coordinated with the Vermont Department of Public Safety.

Management Strategies and Actions:

- Work cooperatively with the Vermont Department of Public Safety and licensed users to manage and maintain the communication site.
- Minimize the influences of activities and impacts to aesthetics on adjacent lands.
- Maintain current licenses with tower tenants.

Figure 12: Land Use Classification Map

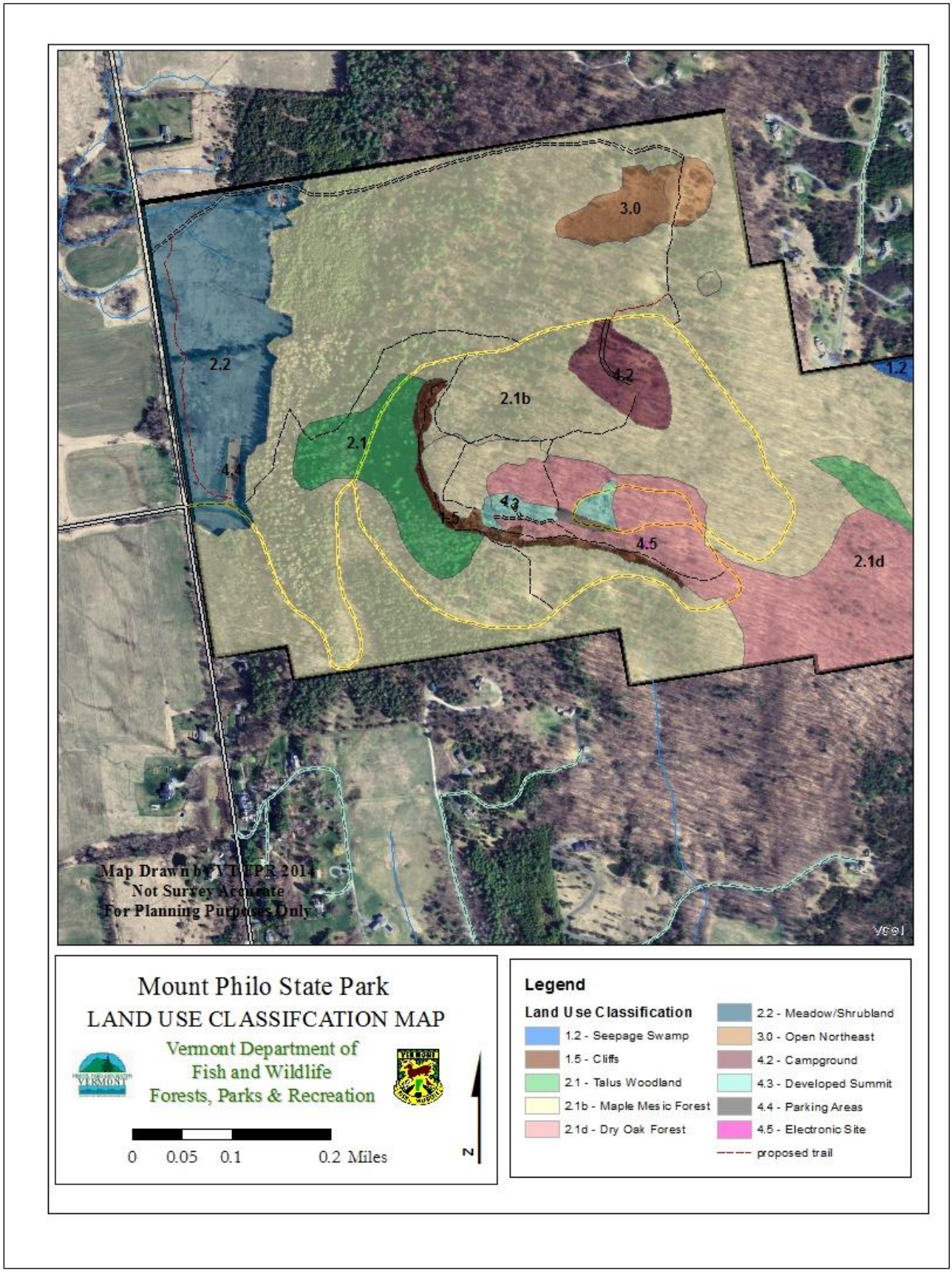
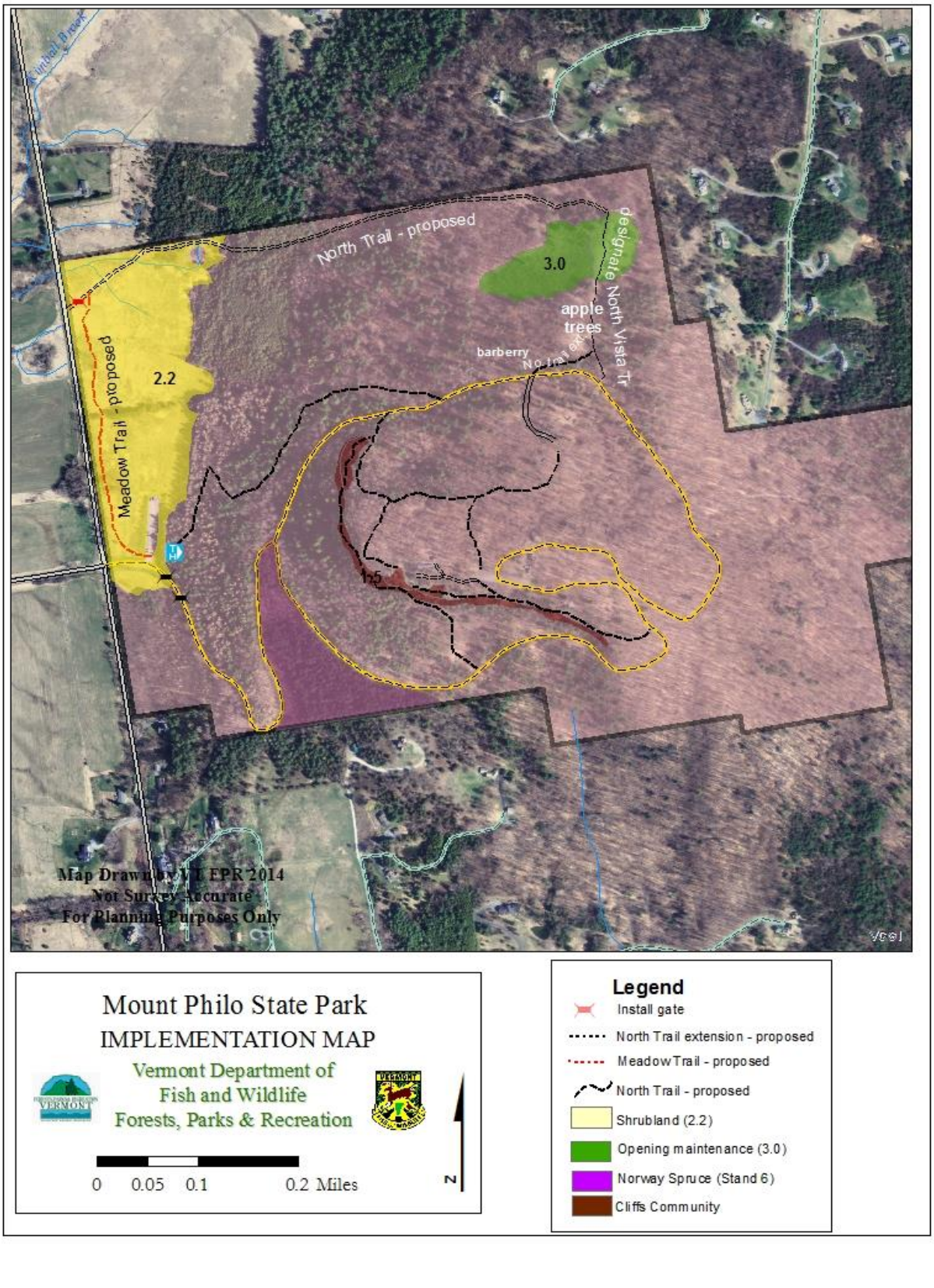


Table 12: Implementation Schedule

Activity	Location	Metric	Goal	Year	Outcome
Boundary line maintenance	State park perimeter	na	Maintain identification of boundary lines by repainting regularly	2017 10-year cycle	All lines located and blazed
Trail maintenance	All trails	1.5 mi	Maintain trails to provide quality hiking experience, protect resources & prevent erosion	Annual	High quality trail system
Trail maintenance	All trails	1.5 mi	Schedule major trail maintenance projects as needed to support high number of hikers while minimizing impacts to the environment, facilities and recreational experience.	Periodic	High quality trail system.
Trail signing	All trails	na	Install, maintain & keep current all trail signage	Annual	Appropriately signed trail system
Kiosk maintenance	Trailhead	na	Maintain kiosk structure and current information	Annual	Informed hikers and park visitors
Park facility maintenance	Campground Parking, picnic area		Maintain based on annual assessment and funding availability based on statewide prioritization	Annual	Well maintained park facilities for visitor use and enjoyment.
Invasive Plant monitoring and Treatment	Throughout Prioritize to protect RTE, intact forest blocks	232 ac	Assess, monitor & prioritize management of invasive species. Limit spread and introduction.	Annual	Reduce invasive plants. Enhanced native species composition. Improved public health.
Invasive Plant Management	2.1b	2 ac	Control barberry with mechanical or chemical treatment as labor or funding available. North slope across from campground (blue gate).	2018	Protect native species composition. Protect public health.
Meadow Mowing/ Maintenance	2.2 3.0	27	Maintain bird and pollinator habitat through program of regular brush hogging	Annual	Grasses, shrubs, herbs retained in. Promote native species.
Poison parsnip	2.2	22	Map and assess poison parsnip. Employ rotational mowing regime (3x+/year) timed to bloom time.	Annual	Reduce coverage of poison parsnip. Enhanced native

Activity	Location	Metric	Goal	Year	Outcome
			Organize volunteer and staff labor as appropriate & available. Maintain viable pollinator habitat.		species composition and habitat.
Road & parking maintenance		na	Well-maintained surface and drainage on park access infrastructure.	Annual	High quality roads and parking.
Barricade unauthorized access	2.2 North Road	Na	Install gate or barricade to control unauthorized access from town road.	2019	Protect recreational resource.
Apple tree release and pruning	North of campground 2.1b	5	Rehabilitate wild apple trees	2018	Bloom and apple production enhanced.
Rare, Threatened and Endangered Species survey	Summit, cliffs – 1.5	na	Monitor RTE species especially in areas of high use	2018	Protection of rare and uncommon species and habitat.
Hiking trail development	North parcel 2.1b	0.6 mi	Establish new hiking trail on existing woods road at northern boundary to connect to North Vista Trail in 3.0 & Meadow Trail in 2.2. Assess and install appropriate drainage structures.	2020	North Trail 0.5 miles, connect to North Vista Trail
Hiking trail development	Western meadow 2.2	0.3 mi.	Establish new hiking trail along western edge of meadow	2020	Meadow Trail - connect to North Trail
Hiking trail development	North parcel 2.1b	0.1 mi	Establish new hiking trail to connect North Vista Trail to "down road" across from campground road	2018	Connection between campground (& summit trail) and North Vista w/out using road.
Vegetation Management	Stand 6 Norway spruce	7	Thin to maintain stand vigor and quality.	Evaluate Consider thinning in 2025	Heathy and vigorous stand.
Vegetation management	Dependent upon scale and location of event	TBD	Salvage as necessary Dependent upon natural weather events	As needed following event	Maintain safe conditions for recreation. Salvage forest product & economic loss.

Figure 13: Implementation Map



V. MONITORING AND EVALUATION

During the life of the LRMP for Mt. Philo State Park, periodic and regular monitoring and evaluation will be conducted to ensure that the resources are protected from fire, insect and disease, encroachments, natural events (wind or ice storms, heavy precipitation events), impacts from high visitation related to recreation or unforeseen problems that may occur within the Mt. Philo State Park. Management activities will be evaluated to determine how closely the results matched those projected within the plan. Minor adjustments in management may be made to reflect changed conditions or unanticipated results.

As long-term management for Mt. Philo State Park continues, inventory, monitoring, assessment, and research are necessary to: evaluate the status of the resource; assess progress toward achieving stated goals; and determine the effectiveness of management actions and activities.

- Were proposed strategies and actions carried out?
- Did the strategies and actions have the intended effect?
- Were the results consistent with expectations and predictive models?
- Do we have the necessary information to understand and evaluate actions taken on Mt. Philo State Park?

Obtaining quality information is critical to making informed decisions and conducting sound, thoughtful management actions. Research projects on Mt. Philo State Park are directed by the District Stewardship Team to ensure that they do not conflict with the goals and objectives for the state park as set forth in the LRMP. It is important that individual research projects be assessed for their effects on the resource, potential conflicts with other uses or users, and consist of quality proposals from credible institutions and individuals. All data from private research will be shared with the Agency of Natural Resources.

Ecological/Wildlife

Maintaining the biological diversity of Mt. Philo State Park requires long-term research and monitoring projects in several areas. Some of the efforts at meeting these goals include:

Strategies and Actions:

- Continue to support ongoing inventory and assessment projects promoting the collection and documentation of quality long-term information critical to the assessment and evaluation of management on Mt. Philo State Park (including forest inventory, aerial insect and disease surveys, amphibian and reptile surveys, invasive species surveys).
- Monitor rare, threatened, and endangered species and natural communities.
- Consider and support appropriate, credible research project proposals which further understanding of ecological elements and wildlife habitat on Mt. Philo State Park and the impacts of management activities.

Forest and Wildlife Habitat

Forest management and timber harvest are important tools used to achieve wildlife habitat and forest management objectives. An effective monitoring and assessment program is essential for ensuring the long-term sustainability of a quality timber management program. Careful analysis of the forest, its resource capabilities, potential impacts on other important management goals, protection of rare and/or threatened endangered species, water quality, management or protection of rare and/or state significant natural communities, and the documentation of the occurrence of natural processes (i.e., insect and disease outbreaks, blowdown events) is important in the execution and understanding of the effects of forest management actions.

Timber harvests and wildlife management activities completion within the Mt. Philo State Park will be periodically reviewed by the stewardship forester and the District Stewardship Team to determine how well management objectives are being met. If monitoring results indicate that there is a significant difference between the outcomes predicted by the plan and actual conditions, changes to the plan may be recommended.

Strategies and Actions:

- Continue to support ongoing assessment and mapping efforts (e.g., forest inventory, aerial insect and disease surveys).
- Conduct periodic, standardized post-practice assessments to assess effectiveness of management activities.
- Support proposals for appropriate research addressing long-term evaluation of forest management activities. Gather baseline data as necessary and practical to support assessment of management effectiveness and impacts.

Recreation

Public recreation will be periodically monitored across the property by the District Stewardship Team to identify where recreational uses conflict with or may be damaging natural resources. Changes in recreational uses may be implemented including new management strategies designed to minimize or eliminate conflicts. State game wardens will be utilized to assist with maintaining compliance with state laws where specific and/or ongoing problems are occurring.

Strategies and Actions:

- Document illegal use and damage of resources.
- Monitor levels of use, group use, impacts to resources, facilities and experience from high park visitation
- Support appropriate research projects including the collection of baseline data to expand knowledge of recreational carrying capacity, resource impacts, and user conflicts.

Historic

There are both historic and suspected pre-contact resources within the Mt. Philo State Park. Current understanding and documentation of these resources varies by site. Detailed documentation and study of field evidence is an important component to the understanding,

protection, and interpretation of the individual sites and the greater historic context of Mt. Philo State Park and surrounding areas.

Strategies and Actions:

- Continue to inventory, map, and document historic features.
- Monitor and document condition of known historic features using standardized forms and photo documentation.
- Support efforts to research the history of Mt. Philo State Park.

Invasive Exotic Species

Invasive exotic species are known to be a problem in many areas of the state negatively impacting wildlife habitat, timber management, natural community composition, recreation, and economics. The District Stewardship Team will monitor the Mt. Philo State Park for the presence of invasive exotic species and work with cooperating partner organizations to develop a monitoring protocol. The District Stewardship Team will work to identify populations of invasive exotic species and implement control measures where feasible.

Strategies and Actions:

- Identify invasive species when populations are small. Develop control goals and implement.
- Assess and document levels of introduction of invasive exotic plants by species and location.
- Monitor timber harvest areas before and after timber sale activities. Control invasive species as necessary and practical.
- Evaluate invasive species control projects for effectiveness.

Climate Change

If the most conservative current models of climate change are accurate (Iverson, Prasad, Hale, & Sutherland), Mt. Philo State Park, like the rest of the region, will experience strong impacts over the next 50-100 years. These changes may have important consequences for forest nutrient cycling, timber productivity, forest pest ecology, wildlife habitat, and our enjoyment of the forest.

Strategies and Actions:

- Monitor ground conditions, results of management, research, and adaptations of silvicultural guides to inform management decisions and adapt treatment prescriptions as appropriate.
- Support appropriate research project proposals which further understanding of climate change on Mt. Philo State Park.

VI. NEW USES AND PLAN AMENDMENT PROCESS

The long-range management plan provides guidance for the long-term management and development of a parcel of state land. However, the future cannot be fully determined at the time of plan development. The departments of Fish & Wildlife and Forests, Parks and Recreation undertake an amendment or plan update process when significant changes to the current long-range management plan are proposed. These may include:

1) Substantial changes to any goals, management objectives, and implementation actions contained in the current plan;

2) Major change in land use, land classification, or species management direction;

3) Designation of non-developed camping sites (via statute regarding camping on state lands);

4) Permanent closure of existing trails and/or permanent creation of new recreation corridors not identified in the current plan;

5) Major rerouting, reclassification, permanent closing or creation of new roads (not including forest management access roads not meant for normal vehicle traffic) within state land boundaries not identified in current plan;

6) Major land acquisitions added to the existing parcel;

7) Major capital expenditures for new projects;

8) Facility closures;

9) Transfers in fee ownership;

10) Leasing of new acreage (e.g., ski resort); and

11) Renaming of natural features (prior to recommendation to Department of Libraries) or lands.

When the amendment process is triggered, a public involvement process begins. The type of process is determined at the time and is dependent upon the extent and type of amendment. If applicable, the easement holders are notified to discuss the proposed amendment.

There may be times when the public input and comments are sought regarding plan changes that are less significant than those triggering the plan amendment process. This is left to the discretion of the District Stewardship Team.

VII. FUTURE ACQUISITION/DISPOSITION

Through its October 1999 *Vermont Agency of Natural Resources Lands Conservation Plan*, the Agency outlined priorities for acquiring new lands as well as for acquiring additions to existing ANR lands. It is the State's policy to acquire additions to ANR state lands parcels that are:

1) necessary for maintaining or enhancing the integrity of existing state holdings;

2) lands, such as inholdings and other parcels that serve to consolidate or connect existing state holdings and contain important public values and/or facilitate more efficient ANR land management;

3) parcels that enhance or facilitate public access to ANR lands; and

4) parcels that serve an identified facility, infrastructure, or program need.

All new acquisitions of land to MPSP will be guided by this plan and must have a willing seller, as the Agency does not have the authority to exercise eminent domain. They will also be done in consultation with the regional planning commissions and the town(s) in which the parcel is located.

All future acquisitions to Mt. Philo State Park will require an amendment to this comprehensive long-range management plan prior to active management of the newly acquired parcel.

APPENDICES

- APPENDIX 1: Natural Community Assessment

  APPENDIX 2: Forest Inventory Data and Stand Map(s)

  APPENDIX 3: 1998 Ice Storm Assessment

  APPENDIX 4: Public Comment Summary

  APPENDIX 5: Recreation Survey Summary

  APPENDIX 6: Works Cited

  APPENDIX 7: Glossary

APPENDIX 1: Natural Community Assessment

Mount Philo State Park – Ecological Assessment

2012-01-24

The Agency of Natural Resources uses a "coarse filter/ fine filter" approach to the ecological inventory and assessment of state lands (Jenkins 1985; Noss 1987; Hunter et al. 1988; Hunter 1991; Noss and Cooperrider 1994; Haufler et al. 1996; Jenkins 1996; Poiani et al. 2000). Widely employed as a management tool on state, federal, and private lands (see for example: Leslie et al. 1996; Committee of Scientists 1999; Stein et al. 2000; USFS 2000, 2004), it is an aid to land managers who seek to protect most or all of the species that naturally occur on their lands, but who lack the resources to make exhaustive inventories of all taxonomic groups. Because many groups of organisms are cryptic or poorly understood (for example, fungi and soil invertebrates), it is not practical to make lists of all of them (Anderson et al. 1999; Willis and Whittaker 2002). Even if we could assemble such lists of species, it would be impossible to manage the land with all of them in mind. Instead, natural communities are treated as a proxy for the biological organisms of which they are composed. It is thought that if examples of all of Vermont's natural communities are conserved at the scale at which they naturally occur, most of the species they contain, from the largest trees and mammals to the smallest insects, will also be conserved (NCASI 2004). Natural communities are thus a coarse filter for "catching" the majority of an area's native organisms. Because conservation of habitats (in the form of natural communities) will not protect all species, we also employ a "fine filter" to catch the remaining species that are known to require very specific conditions for their growth, reproduction, wintering, etc. Examples of organisms benefiting from the fine filter inventories described below include breeding birds, deer on their wintering areas, and rare plants.

The coarse filter assessment begins by describing landscape and climatic factors that characterize Mount Philo State Park (MPSP), such as bedrock geology and water resources. It then details the nine distinct natural community types documented and mapped during inventories of MPSP. This is followed by a fine filter assessment describing rare species and wildlife habitats found here.

Coarse Filter Assessment

Biophysical Region and Climate

Vermont's landscape is divided into eight regions that share similar features of climate, topography, geology, human history, and natural communities. MPSP is located in the Champlain Valley biophysical region, which is found along Lake Champlain, stretching from the Canadian border south to the town of West Haven. The Champlain Valley is the warmest and driest part of Vermont, and physiologically it has more in common with the Saint Lawrence Valley and the Great Lakes region than the Green Mountains or the Adirondacks that border it. The terrain is generally flat near the lake, with gently sloping foothills leading up to the Green Mountains. The bedrock is generally calcareous metamorphic rock, but often the bedrock is buried by deep post-glacial sediment accumulations. The Champlain Valley has a long

history of agricultural use that continues into the present day; much of the land in the region is actively farmed. Forested remnants, such as the patch on Mount Philo, are typically small and isolated.

Bedrock, Surficial Geology and Soils

The geologic history of an area can have a strong influence on the distribution of species and natural communities. Mount Philo has an interesting geologic history that has been well-documented (see for example Gale and Anderson 1998). The parcel is located on the Champlain Thrust Fault, which pushed older rock of the Monkton quartzite formation over the younger Stony Point shale. Thus, the rocks at the top of the mountain are older than those at the base. Both rock formations are nutrient-rich and can contribute to soil enrichment. In addition, the exposed rock outcrops and cliffs can support a diverse selection of plants, many of which are rare in the state. The degree to which bedrock affects growing conditions at MPSP is also mediated by the depth of the surficial materials deposited at the end of the last continental glaciation, some 15,000-12,000 years ago. As the glacier ice melted, rock fragments of all sizes, from boulders to clay, fell in an unsorted jumble known as glacial till. At the same time, the Champlain Valley was flooded first with a freshwater glacial lake, and then by ocean water that extended up the Saint Lawrence Valley. Water levels reached as high as a present-day elevation of 600 feet, leaving the summit of Philo exposed as an isolated island (Wright 2009). Within these water bodies, silts and clays settled out to form a thick layer which buried the till in places, and as the water lowered to its present level, these silts and clays were exposed. Today, the lower elevations of MPSP have silt and clay-derived soils while the higher elevations have till-derived soils. The soils mapped by the NRCS in the park include the till-derived Farmington, Georgia, Massena, and Stockbridge/Nellis series, as well as Vergennes series in the lowest elevations in the open fields. Finally the very small wetlands on the property have post-glacial accumulations of peat and muck.

Hydrology/Streams/Rivers/Ponds

MPSP receives around 34” of precipitation annually, which is drier than average compared to the entire state (some places in the Green Mountains can receive up to 70” of precipitation in a year). The entire parcel is within the Lake Champlain watershed. The majority of the water draining from the parcel eventually reaches Lewis Creek or Kimball Brook, but a small portion of the parcel drains to the La Platte River. Overall the park is very dry, with only tiny seasonal streams and two minor wetlands on the property. There is a small pond as well, which is likely of human origin.

Natural and Human Disturbance

Natural disturbance processes, such as wind, fire, and flooding, continually shape landscapes and define their natural communities. The most frequent upland natural disturbances at MPSP are small-scale, ongoing events, resulting in individual tree death and canopy gap dynamics. Moderate scale disturbances such as blowdowns, ice storms, and insect defoliation events are expected less frequently, but have the potential for larger impacts. Very large scale disturbances (events affecting many hundreds of acres or more) are expected to occur rarely, but if an event does occur it would have the potential to create dramatic changes in natural communities.

Land use history also influences the present-day distribution of natural communities at Mount Philo SP. Like much of the Vermont landscape, especially in the Champlain Valley, the parcel has a history of agriculture and timber harvesting. Evidence of these activities can still be found in the relatively young forests of the property and the presence of non-native, invasive species. The legacy of human land use will continue to affect the natural communities for a long time.

Natural Communities

A natural community is an assemblage of biological organisms, their physical environment (e.g., geology, hydrology, climate, natural disturbance regime, etc.), and the interactions between them (Thompson and Sorenson 2000). More than a simple collection of species, a natural community is characterized by complex webs of mutualism, predation, and other forms of interaction. The 89 natural community types described in Vermont repeat across the landscape in patches (or "polygons") of various sizes. These patches (or groups of patches in close proximity to each other) are referred to as natural community occurrences, and are to be distinguished from broad descriptions of community types. Natural community occurrences vary greatly in their size. Matrix communities, such as Northern Hardwood Forests, occur in broad expanses across the landscape, and form the context in which other, smaller communities are found. Large patch communities, such as Hemlock Forest, typically occur at scales of 50-1000 acres. Small patch communities such as Seeps are usually less than 50 acres in size; many are much smaller and owe their existence to highly localized site and disturbance characteristics.

Natural communities at Mount Philo State Park were identified through aerial photograph interpretation and field surveys. A Geographic Information System (G.I.S.) map of natural communities was produced using ArcView software from ESRI, Inc. Because some natural communities occur at very small scales (e.g., less than ¼ acre), this mapping effort is probably incomplete. Natural community mapping is an iterative process, and our knowledge improves with each mapping effort. Thus, the map presented here should not be viewed as a final statement on community distribution at MPSP; instead, it should be treated as a first attempt at describing natural communities in this area. Land managers and members of the public should be aware that additional examples of small patch natural communities may occur on the management unit. As subsequent inventories and site visits are conducted, this map will be improved.

Natural community occurrences are assigned a quality rank, a statement of their overall ecological value which helps guide management. An "A"-ranked occurrence is of high quality relative to others of its type in the state, while a D-ranked example is of comparatively low quality. Quality ranks are objectively assigned on the basis of three factors: occurrence size, current condition, and landscape context. The three factors vary in the degree to which they influence overall quality in different communities. For example, size and landscape quality are more important factors than current condition in the quality ranking of Northern Hardwood Forests, while current condition and landscape context receive greater attention in the ranking of Rich Northern Hardwood Forests. It is important to recognize that assignment of low quality ranks may be due to small size rather than poor current condition. When community occurrences are either rare or of high quality (or a combination of these factors), they may be

designated as being of “statewide significance”. This designation is applied according to objective guidelines established by the Vermont Department of Fish and Wildlife and which are available upon request. It is recommended that state-significant natural communities be afforded a higher level of protection than other areas of the management unit.

10 occurrences of 9 natural community types were identified and mapped in MPSP (see table below). A total of 11 natural community polygons were mapped. Some broad patterns emerged from this mapping effort. Much of MPSP is characterized by young forests with oaks, hickories, and white pine. Cliffs and outcrops provide important habitats for a number of rare and uncommon plants species, as well as more common species of birds, mammals, and reptiles. Wetlands are almost entirely absent on the parcel. Because of small size and isolated landscape context, the natural communities found at MPSP are not examples of statewide significance. However, locally within the Champlain Valley, where the majority of the land is either developed or used for agriculture, all of these natural community examples are of very high ecological value.

The topography, soils, vegetation, and wildlife associations of each natural community in MPSP are described below.

Natural Communities of Mount Philo State Park				
Natural Community		**Acres**	**Vermont Distribution**	**Example of Statewide Significance?**
Wetlands	Red Maple-Black Ash Seepage Swamp	1	Common	No
	Seep	0.3	Common	No
Uplands	Dry Oak-Hickory-Hophornbeam Forest	28	Uncommon	No
	Limestone Bluff Cedar-Pine Forest	0.5	Rare	No
	Mesic Maple-Ash-Hickory-Oak Forest	159	Uncommon	No
	Mesic Red Oak-Northern Hardwood Forest	4	Common	No
	Temperate Calcareous Cliff	1.7	Uncommon	No
	Temperate Calcareous Outcrop	0.4	Uncommon	No
	Transition Hardwood Limestone Talus Woodland	2	Uncommon	No
For more information on these and other natural communities, see Wetland, Woodland, Wildland: a Guide to the Natural Communities of Vermont, by Elizabeth Thompson and Eric Sorenson. Information may also be found online at: http://www.vtfishandwildlife.com/books.cfm?libbase_=Wetland,Woodland,Wildland				

Dry Oak-Hickory-Hophornbeam Forest
S3 (Uncommon)
Acres: 28
Occurrences: 1
State Significant: No

Twenty-eight acres of this uncommon natural community type are found on the summit of Mount Philo and extending down to the southeast. Dry Oak-Hickory-Hophornbeam Forest is typically found on warm and dry sites, and the patch at MPSP is no exception. One soil sample in this community found just 6" of very rocky soil over bedrock, while another was deeper (up to 3'total) with fine sandy loam over a silty loam. The pH at this second sample was measured at 5.4-5.6 in the sandy loam. As expected, Northern Red Oak (*Quercus rubra*) and Shagbark Hickory (*Carya ovata*) are present in the canopy, at times mixed with Sugar Maple (*Acer saccharum*), White Ash (*Fraxinus americana*), and Black Birch (*Betula lenta*). Eastern White Pine (*Pinus strobus*) can form a sparse (5% cover) emergent canopy in some locations. The subcanopy is characterized by Hop-Hornbeam (*Ostrya virginiana*), but can also include species found in the canopy, as well as *Amelanchier* species, Striped Maple (*Acer pensylvanicum*) and near the summit, Northern White-Cedar (*Thuja occidentalis*). Shrubs include American Witch-Hazel (*Hamamelis virginiana*), Maple-Leaved Viburnum (*Viburnum acerifolium*) and Common Lowbush Blueberry (*Vaccinium angustifolium*). Non-native invasive European Buckthorn (*Rhamnus cathartica*) and honeysuckle (*Lonicera cf. morrowii*) are also present in places. Some characteristic herbs noted in this community include Large-leaved Aster (*Aster macrophyllus*), Blue-Stem Goldenrod (*Solidago caesia*), Pennsylvania Sedge (*Carex pensylvanica*), and Forest Licorice Bedstraw (*Galium circaezans*). The oak and hickory make this community good habitat for squirrel, turkey, white-tailed deer, and other wildlife species that feed on hard mast. Other wildlife species that might be present in this community at MPSP include the common white-breasted nuthatch, and the uncommon ring-necked snake.

Limestone Bluff Cedar-Pine Forest
S2 (Rare)
Acres: 0.5
Occurrences: 1
State Significant: No

A half-acre patch of Limestone Bluff Cedar-Pine Forest is found above the west-facing portion of cliff. The primary hiking trail to the summit travels through this community, and there are ongoing impacts from hiker trampling. Although this community type is rare in Vermont, this patch—even in the absence of disturbance—was probably never an exceptional example of this natural community type. Species noted in this community include a canopy of Eastern White Pine (*Pinus strobus*) and Northern White-Cedar (*Thuja occidentalis*), with a sparse herb layer that includes Rock Polypody (*Polypodium virginianum*), Blue-Stem Goldenrod (*Solidago caesia*), Hairy Solomon's-Seal (*Polygonatum pubescens*), Marginal Wood Fern (*Dryopteris marginalis*), and Plantain-Leaved Sedge (*Carex plantaginea*). Ebony Sedge (*Carex eburnea*), which can be characteristic of this natural community type, is notably absent.

Soils are very thin, with a relatively thick organic layer. At one site with some mineral soil, a pH of 6.4-6.6 was measured. Given its small size and general lack of vegetation diversity, this patch probably provides few if any special wildlife habitat characteristics.

Mesic Maple-Ash-Hickory-Oak Forest
S3 (Uncommon)
Acres: 159
Occurrences: 1
State Significant: No

This natural community is the matrix forest type for MPSP. Because of the long history of land use and disturbance in the park, much of the area mapped as this natural community type does not currently reflect the expected natural vegetation. In particular, the northern portion of the park is dominated by stands of Eastern White Pine (*Pinus strobus*) and Northern White-Cedar (*Thuja occidentalis*). In these areas, invasive species such as Asian Bittersweet (*Celastrus orbiculatus*) pose a threat to the long-term recovery of the natural community. The eastern and southern areas are relatively less disturbed, with a canopy that includes Sugar Maple (*Acer saccharum*), Shagbark Hickory (*Carya ovata*), American Linden (*Tilia americana*), White Ash (*Fraxinus americana*), and Bitternut Hickory (*Carya cordiformis*). Hop-Hornbeam (*Ostrya virginiana*) is present in the understory, and shrubs include Alternate-Leaved Dogwood (*Cornus alternifolia*), Bush-Honeysuckle (*Diervilla lonicera*). Some areas also have invasive European honeysuckle (*Lonicera* sp.) and European Buckthorn (*Rhamnus cathartica*). Herbs noted include Broad-leaved Ricegrass (*Oryzopsis racemosa*), Forest Licorice Bedstraw (*Galium circaezans*), Sticky Tick-trefoil (*Desmodium glutinosum*), American Hog-Peanut (*Amphicarpaea bracteata*), Large-Flowered Bellwort (*Uvularia grandiflora*), Plantain-Leaved Sedge (*Carex plantaginea*), and Large Enchanter's Nightshade (*Circaea lutetiana*). Soil in this community is thin and rocky, and while the pH was not measured, it is likely enriched from the calcareous bedrock. White-tailed deer, turkey, and a wide variety of breeding songbirds would all be expected to be found in this community at MPSP.

Mesic Red Oak-Northern Hardwood Forest
S4 (Common)
Acres: 4
Occurrences: 1
State Significant: No

A four-acre patch of this community is found on the northwestern side of the summit. This area, while currently characterized by Sugar Maple (*Acer saccharum*) and Northern Red Oak (*Quercus rubra*), has had relatively recent harvesting, and is only weakly distinguished from the adjacent Mesic Maple-Ash-Hickory-Oak Forest and Dry Oak-Hickory-Hophornbeam Forest natural communities. As the patch continues to develop over time, it may become apparent that it is better included with one of those community types. At present, this patch has a distinct two-age structure, with a emergent canopy (30% cover) of 50’ tall sugar maple and red oak that range from 12-20” dbh. The secondary canopy (70%

cover) is only 15-20’ tall and includes Sugar Maple (*Acer saccharum*), Striped Maple (*Acer pensylvanicum*), Staghorn Sumac (*Rhus typhina*), and Hop-Hornbeam (*Ostrya virginiana*). Shrubs (<10% cover) include Alternate-Leaved Dogwood (*Cornus alternifolia*), Flowering Raspberry (*Rubus odoratus*), and invasive honeysuckle (*Lonicera* sp.). Herbs (<5% cover) include Marginal Wood Fern (*Dryopteris marginalis*), Evergreen Wood Fern (*Dryopteris intermedia*), and White-Grained Rice Grass (*Oryzopsis asperifolia*). Soil is very shallow, with 0-4” of sandy loam over rock. Wildlife in this small patch would include species found in the adjacent forest communities.

Red Maple-Black Ash Seepage Swamp
S4 (Common)
Acres: 1
Occurrences: 1
State Significant: No

A disturbed example of a Red Maple-Black Ash Seepage Swamp is found on the east side of MPSP. It is the only substantial wetland natural community in the park, thus despite relatively poor ecological condition, it provides important habitat diversity. This patch was inventoried after the growing season, so a full list of vegetation was not collected. Species that were noted include Eastern White Pine (*Pinus strobus*), American Elm (*Ulmus americana*), Bitternut Hickory (*Carya cordiformis*), Eastern White Oak (*Quercus alba*), Scotch Pine (*Pinus sylvestris*), and European Larch (*Larix decidua*) in the canopy; European Buckthorn (*Rhamnus cathartica*) and Morrow's Honeysuckle (*Lonicera morrowii*) in the shrub layer; and Sensitive Fern (*Onoclea sensibilis*) in the understory. Poison-Ivy (*Toxicodendron radicans*) is abundant, along with invasive Asian Bittersweet (*Celastrus orbiculatus*). Ground cover includes small hummocks and hollows with mosses. This wetland may provide good habitat for amphibians and other species benefiting from moist soils and swamp habitat. Additional inventory should be conducted prior to any management that may affect this patch.

Seep
S4 (Common)
Acres: 0.3
Occurrences: 1
State Significant: No

Though almost all of MPSP is dry upland, one Seep is mapped on the northeast slope of the mountain. Compared to most Seeps with abundant groundwater flow, this example barely qualifies as this natural community type. It may simply collect and concentrate groundwater from a very small local watershed, but the result is that this patch has some wetland-affiliated vegetation. Species noted include Black Ash (*Fraxinus nigra*), Ostrich Fern (*Matteuccia struthiopteris*) and Sensitive Fern (*Onoclea sensibilis*), Northern Lady Fern (*Athyrium filix-femina*), Small Enchanter's-Nightshade (*Circaea alpina*), and a *Geum* species. European Buckthorn (*Rhamnus cathartica*) and Morrow's Honeysuckle (*Lonicera morrowii*) are also present. The soil, which has likely been affected by past plowing and/or grazing, appeared to be a

very dense silt loam. This seep may provide some important habitat for red-backed salamanders during dry conditions, and might be a source of early-spring herbaceous browse for white-tailed deer.

Temperate Calcareous Cliff
S3 (Uncommon)
Acres: 1.7
Occurrences: 1
State Significant: No

The Temperate Calcareous Cliff may be one of the most distinctive features to park visitors. The cliff extends nearly unbroken for approximately a half mile on the western and southern faces of Mount Philo. The exposed rock is primarily of the Monkton Formation, which ranges in character from a more resistant quartzite to a more erodible dolostone. While much of the cliff is barren, some crevices and ledges do support vegetation. Because of their inaccessibility, these areas were not thoroughly surveyed, but some common plants expected on the cliff include Red Columbine (*Aquilegia canadensis*), Maidenhair Spleenwort (*Asplenium trichomanes*), Harebell (*Campanula rotundifolia*), Mountain Crane's-Bill (*Geranium robertianum*), and Canada Windflower (*Anemone canadensis*). At least two rare plants are known to grow on this cliff: Rock Whitlow-Mustard (*Draba arabisans*), and Nodding Stickseed (*Hackelia deflexa spp. americana*). Several other rare species are found on the outcrops near the top of the cliff and may also be present on the cliff face or some of the larger ledges; these might include Douglas's Knotweed (*Polygonum douglasii*), Rattlesnake Hawkweed (*Hieracium venosum*), and Ledge Spikemoss (*Selaginella rupestris*). Recreational rock climbing and scrambling pose a threat to this community and the rare plants. Turkey vultures and ravens may use this as nesting or roosting habitat, and garter snakes could use the ledges as basking sites.

Temperate Calcareous Outcrop
S3 (Uncommon)
Acres: 0.4
Occurrences: 1
State Significant: No

Temperate Calcareous Outcrop is found along the top of the cliff band at MPSP. Two patches have been mapped, totaling 0.4 acres, but there are additional very small outcrops located all along the clifftop. Many park visitors are likely familiar with this community, because these outcrops offer expansive views of the Champlain Valley. The long history of human activity on the summit of Mount Philo has impacted this natural community, and for the most part this community is very heavily disturbed and sparsely vegetated. At least five rare plant species are known to occur on these outcrops, and all are threatened by trampling from visitors: Douglas's Knotweed (*Polygonum douglasii*), Rock Whitlow-Mustard (*Draba arabisans*), Rattlesnake Hawkweed (*Hieracium venosum*), Tall Wood-Beauty (*Drymocallis arguta*), and Ledge Spikemoss (*Selaginella rupestris*). Interestingly, the non-native White Stonecrop (*Sedum album*) is widespread in this community. It is not known if this species, which is not typically considered an

invasive, is outcompeting and displacing native plants in this setting. If it were found to be having a negative effect on native vegetation, it should be considered an invasive species and managed accordingly. Given the high concentration of recreational use, these outcrops are likely poor wildlife habitat. They may be used by some bird and snake species.

Transition Hardwood Limestone Talus Woodland
S3 (Uncommon)
Acres: 2
Occurrences: 2
State Significant: No

Two examples of this uncommon community type (which is a variant of Transition Hardwood Talus Woodland) are found in MPSP. One is located below the large temperate calcareous cliff, while the other is located on the eastern side of the mountain. The rocky substrate is a mix of the Monkton formation quartzite and dolostone, and the Stony Point Shale. The shale forms a very loose talus composed of small rock fragments, while the quartzite and dolostone boulders range from softball size to over 4' on the longest edge. Soil is a thin veneer of mostly organic matter over the talus; a pH of 6.0 was measured at one site. The vegetation in this community is diverse, as a result of mineral enrichment from the rocks. Species noted include American Linden (*Tilia americana*), Sugar Maple (*Acer saccharum*), Northern Red Oak (*Quercus rubra*), White Ash (*Fraxinus americana*), Bitternut Hickory (*Carya cordiformis*), and Cherry Birch (*Betula lenta*) in the canopy; with a similar composition along with Hop-Hornbeam (*Ostrya virginiana*) in the understory. Shrubs noted include American Witch-Hazel (*Hamamelis virginiana*), Maple-Leaved Viburnum (*Viburnum acerifolium*), and Alternate-Leaved Dogwood (*Cornus alternifolia*). Herbs include Pale Touch-Me-Not (*Impatiens pallida*), Poison-Ivy (*Toxicodendron radicans*), Mountain Crane's-Bill (*Geranium robertianum*), Blue-Stem Goldenrod (*Solidago caesia*), Canada Wood-Nettle (*Laportea canadensis*), White Baneberry (*Actaea pachypoda*), Walking Fern (*Asplenium rhizophyllum*), Bulblet Fragile Fern (*Cystopteris bulbifera*), Northern Maidenhair Fern (*Adiantum pedatum*), Ziz-Zag Goldenrod (*Solidago flexicaulis*), and Blunt-lobed Hepatica (*Hepatica americana*). The rocky habitat may be suitable for snake species such as garter snake, Dekay's brown snake, and ring-necked snake.

Fine Filter Assessment

Rare, Threatened, and Endangered Species

Mount Philo State Park is home to many rare and uncommon plant species. These species and their management needs are summarized in the table and text below.

PLANTS

Seven species of rare or very rare plants are known to occur within MPSP, as well as an additional five species of uncommon plants. Of the rare/very rare species, one is listed as "endangered" and another is listed as "threatened" by Vermont state endangered species statute (10 V.S.A. 123). Their occurrence in MPSP is thus very important on a statewide basis. Note that one species is not included in this report because of data sensitivity concerns; land managers are aware of this species and its management considerations.

Mount Philo has a rich history of botanical exploration, with plant inventory records dating back into the 19th century. In addition to the twelve species above, there are historical records for another ten very rare, rare, and uncommon species that have been observed on Mount Philo. Two of these species are state-listed as "threatened" and one is state-listed as "endangered." The most recent of these records is from 1929. While there have been many land use changes and disturbances since the early 20th century, it is possible that some or even all of these plants are still present and could be rediscovered within MPSP. Therefore, additional inventories for rare species should be a high priority, especially at sites with proposed management activities.

Many of the rare and uncommon plants at MPSP are associated with cliff and outcrop habitats, and are subject to negative impacts from visitor trampling and rock scrambling and climbing. A few additional plants are found immediately along hiking trails, and are also at risk of accidental negative impacts. Ongoing monitoring, combined with park signage, outreach, and careful guidance of foot traffic, are all necessary to maintain the long-term viability of these plant populations.

A few rare and uncommon plant species occur in forested habitats. Maintaining closed canopy cover and preventing direct disturbance are the best strategies for protecting these populations.

Rare, Threatened, and Endangered Plants of Mount Philo State Park

	Species Name	Common Name	Sites Where Found[1]	State Rarity Rank[2]	Rarity[2]	Legal Status
SPECIES KNOWN TO BE PRESENT FROM RECENT RECORDS	*Hackelia deflexa spp. americana*	Nodding Stickseed	Outcrops and cliffs	S2	Rare	Threatened
	Muhlenbergia sobolifera	Rock Muhly	Woods below cliffs	S2	Rare	
	Phegopteris hexagonoptera	Broad Beech Fern	Forests	S2	Rare	
	Polygonum douglasii	Douglas's Knotweed	Outcrops	S2	Rare	Endangered
	Scutellaria parvula var. parvula	Small Skullcap	Unknown (1904)	S2	Rare	
	Draba arabisans	Rock Whitlow-Mustard	Outcrops and cliffs	S2S3	Rare/Uncommon	
	Hieracium venosum	Rattlesnake Hawkweed	Outcrops	S2S3	Rare/Uncommon	
	Diplazium pycnocarpon	Narrow-leaved Glade Fern	Rich woods	S3	Uncommon	
	Drymocallis arguta	Tall Wood-Beauty	Outcrops	S3	Uncommon	
	Scrophularia lanceolata	Lance-Leaved Figwort	Open woods	S3	Uncommon	
	Selaginella rupestris	Ledge Spikemoss	Outcrops	S3	Uncommon	
	Symphoricarpos albus	Common Snowberry	Dry woods and outcrops	S3	Uncommon	
SPECIES KNOWN ONLY FROM HISTORICAL RECORDS, MAY BE PRESENT	*Juncus secundus*	Lopsided Rush	Summit (1929)	SH	State Historical[3]	Endangered
	Botrychium rugulosum	St. Lawrence Grapefern	Unknown (1915)	S1	Very Rare	
	Pterospora andromedea	Pine-Drops	Pine woods (1917)	S1	Very Rare	
	Juncus torreyi	Torrey's Rush	Damp roadside (1920)	S2	Rare	
	Piptatherum pungens	Short-Awned Mountain-Rice Grass	Dry shaded ledges (1892)	S2	Rare	Threatened
	Platanthera hookeri	Hooker's Bog-Orchid	Rich woods (1903)	S2	Rare	Threatened
	Lespedeza violacea	Wand Bush-Clover	Dry woods (1920)	S2S3	Rare	
	Ophioglossum pusillum	Northern Adder's-Tongue Fern	Pasture (1915)	S2S3	Rare	
	Dichanthelium xanthophysum	Pale-Leaved Rosette-Panicgrass	Unknown (1922)	S3	Uncommon	
	Poa saltuensis ssp. saltuensis	Drooping Bluegrass	Unknown (1922)	S3	Uncommon	

[1] For historical species, includes year of last observation	[3] All known occurrences in VT are from historical records
[2] For a full explanation of these rarity ranks, visit the Vermont Natural Heritage Inventory website: http://www.vtfishandwildlife.com/wildlife_nongame.cfm	

Non-native Species

There are many non-native plant species at MPSP, but most are not a threat to native vegetation, habitats, or wildlife; however, there are a number of notable exceptions. Non-native honeysuckles (*Lonicera* spp.), Barberries (*Berberis* spp.), and Asian Bittersweet (*Celastrus orbiculatus*) are all non-native, invasive species which are present on the property and which are having or are expected to have negative impacts to natural communities, native plants, and wildlife habitats. These and other invasive species tend to follow disturbance, thus any activities that create soil disturbance or canopy gaps in the forest could result in the spread of invasive species. For more information, refer to the Invasive Species Assessment.

Core Forest and Habitat Blocks

Core forest is a biological term used to refer to any forested areas that are greater than 100 meters from human-created, non-forested opening. While edges and transition zones are excellent habitat for some native plant and animal species, edges also negatively impact many forest resources. Increases in invasive species and in predation on many native songbirds, and a decrease in wildlife that prefer to use large blocks of intact forest, are all associated with an increase in forest edge. Additionally, unbroken forest allows for easy dispersal of plants and animals, without large barriers to this movement.

Located in the Champlain Valley, MPSP is a small habitat "island" surrounded by agricultural fields and human development. The park overlaps an approximately 440-acre forested habitat block. While this block extends beyond the park, it is still bounded by Mount Philo Road, Spear Street, Guinea Road, and One Mile Road. Very little of this block is remote enough to function as core forest. However, in the context of the Champlain Valley, even small, isolated habitat blocks can be an important refuge for some wildlife species, such as bobcat.

Wildlife Movement Corridors

Connections between wild lands can serve an important role in maintaining the long-term health and viability of wildlife populations. Wildlife corridors not only allow individual animals (such as young individuals searching for new habitat) to move throughout the landscape, but also allow for the transfer of genetic information across the region. Even the occasional travel of a few individual animals between otherwise isolated populations can substantially increase their long-term viability, because the genetic diversity within each group is effectively increased.

MPSP does not contribute to regional landscape connectivity; however, the parcel probably does contribute to local wildlife movements. Aside from serving as a habitat island (see above section) it is part of a mosaic of the small habitat blocks and brushy riparian corridors that are critical to wildlife movement in the Champlain Valley. MPSP is also close to a relatively intact forested corridor along Lewis Creek, providing an opportunity for some species to move between riparian and upland habitats.

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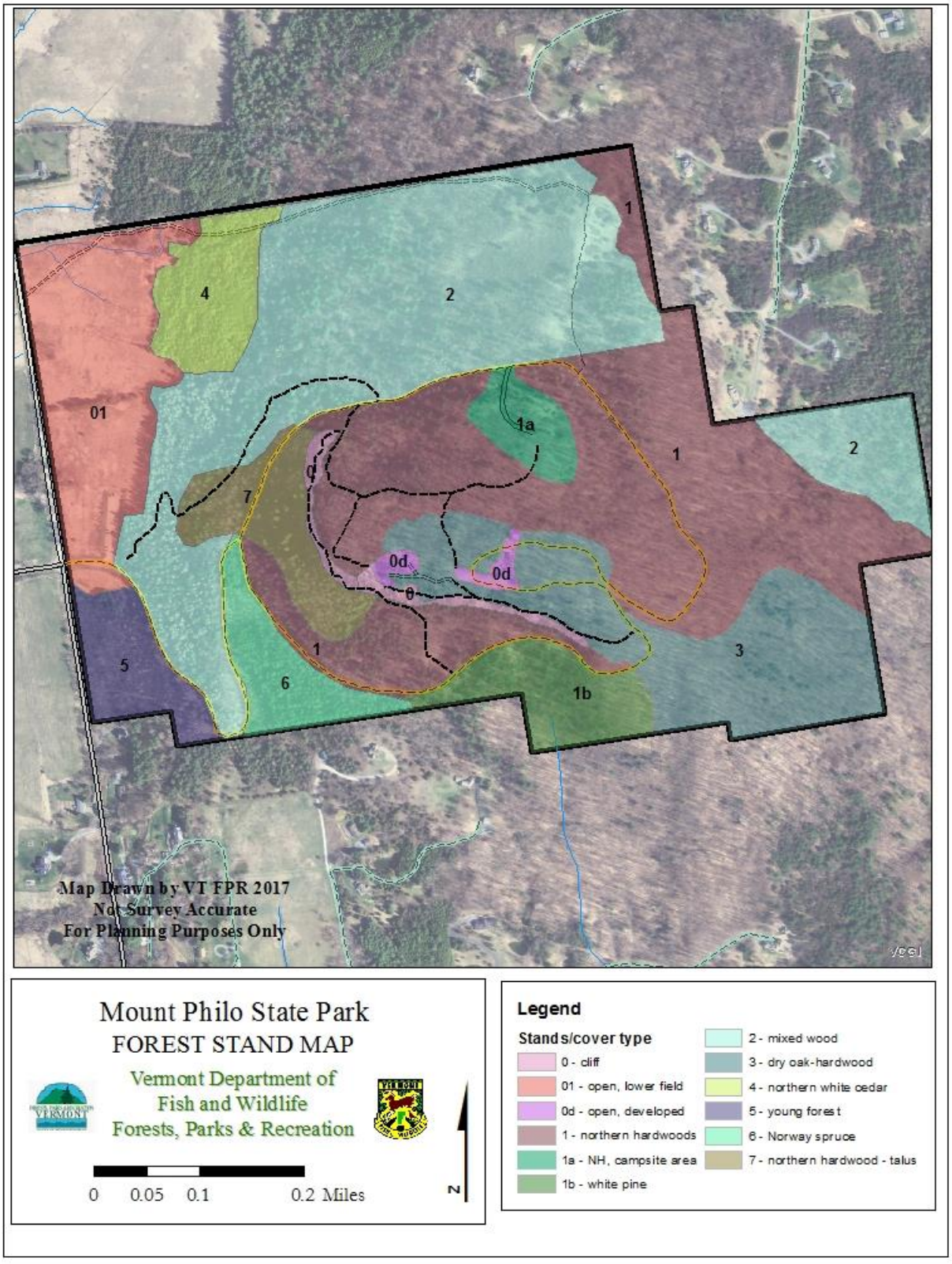
APPENDIX 2: Forest Inventory Data and Stand Map(s)

Mt. Philo State Park - FOREX Data Summary

Comp.	Stand	Size Acres	QMD	BA/A Total	AGS BA/A	UGS BA/A	Timber Type (Natural Community)	Species %BA	Goals
1	1	71	8.1	106	68	38	Northern Hardwood (Mesic Maple-Ash-Hickory-Oak Forest)	Sugar maple – 44% Red oak – 11% White pine – 10% No. White Cedar – 10%	Maintain as healthy forest for its habitat, scenic, timber and recreation values. Enhance climate adaptability. Manage invasive species.
1	2	64	8.4	125	87	37	Oak-pine (Mesic Maple-Ash-Hickory-Oak Forest)	White pine – 34% Tamarack – 14% Sugar maple – 10% Hophornbeam – 10%	Maintain as healthy forest for its habitat, scenic, timber and recreation values. Enhance climate adaptability. Manage invasive species.
1	3	27	10.2	140	110	29	Oak-Hardwood (Dry Oak-Hickory-Hophornbeam Forest)	Sugar maple – 45% Hickory – 14% White ash – 12% Red oak – 5%	Maintain as healthy forest for its habitat, scenic, timber and recreation values. Enhance climate adaptability. Manage invasive species.
1	4	8	4.6	150	49	100	Northern White Cedar (Mesic Maple-Ash-Hickory-Oak Forest)	Cedar – 93% Paper birch – 7%	Remnant of past land use. Maintain cedar as long as possible as diverse habitat component. Not functioning as deer winter habitat.
1	5	7					Early successional (Mesic Maple-Ash-Oak-Hickory Forest)		Allow stand to develop. Manage invasive species.
2	6	5					Norway Spruce (Mesic Maple-Ash-Hickory-Oak Forest)		Maintain stand health and vigor for diversity of habitat, aesthetics and as historic planting as long as possible.
1	7	9	8.6	130	54	75	Northern hardwood (Transition Hardwood Limestone Talus Woodland)	Sugar maple – 27% White pine – 38% No. white cedar – 19%	Maintain as healthy forest for its habitat, scenic, timber and recreation values. Enhance climate adaptability. Manage invasive species.

APPENDIX 2: Forest Stand Map



APPENDIX 3: 1998 Ice Storm Assessment

Mount Philo – 1998 ice storm

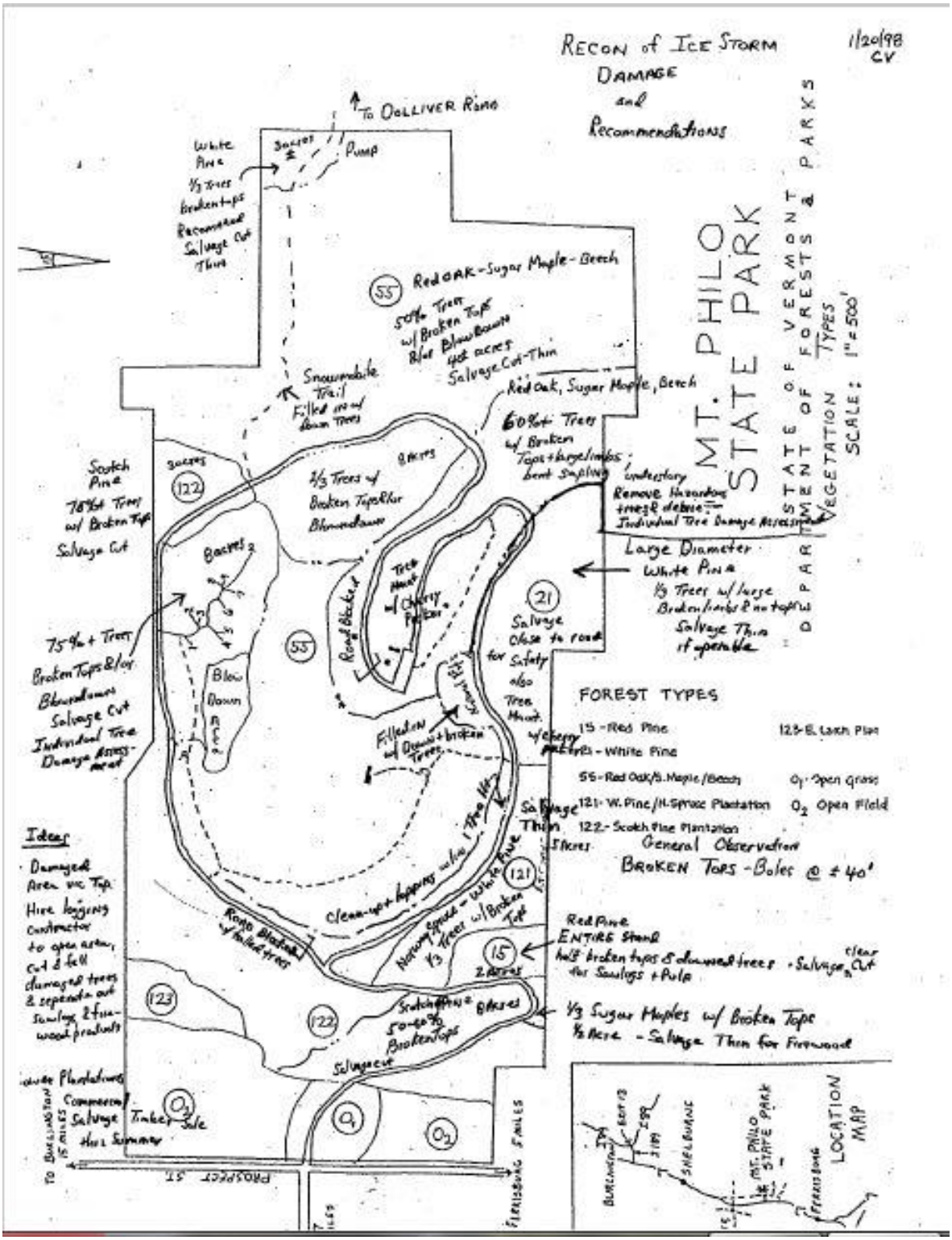
In January 1998, an ice storm of unusual magnitude swept through the northeast region causing extensive damage to forests and property. From January 4 – 9, sustained precipitation in the form of rain, drizzle, freezing rain, freezing drizzle, sleet and snow fell on the northeast. Ice accumulations of 2 – 3 inches were reported in some areas. Gusting winds accompanied additional precipitation events later in the month, causing great stress and damage to the ice laden trees. In Vermont, the storm damaged 940,000 acres of forests including Mount Philo. An estimated 25-40% of greenbelt trees in Burlington were injured.

Prior to the ice storm, Mount Philo contained 5 coniferous plantations (Scots/jack pine, European larch, red pine, white pine and Norway spruce dating back to 1925-1935. Natural vegetation included a variety of northern hardwoods including: sugar maple, red oak, white ash, and beech. Red oak-white oak and sugar maple-beech stands covered 63% of the park, while Scots/jack pine accounted for 23%. A localized tornado struck the north side of the mountain in 1993. The ice storm damaged almost every tree on Mt. Philo (see attached map). About ¼ of the park was logged including the red pine plantation.

Several studies were initiated to assess impacts and monitor recovery. Photos of damaged oaks and sugar maple documented recovery from initial damage in 1998, through 2001 (see photos below). Recovery was aided by wet spring and summer weather. Every day in June 1998 rained.

Damage and recovery of red oak crowns following the 1998 ice storm on Mount Philo, Vermont. Photos are taken in successive years from 1998-2001 (clockwise from upper left). VFPR.

Damage and recovery of sugar maple crown following the 1998 ice storm on Mount Philo, Vermont. Photos are taken in successive years from 1998-2001 (clockwise from upper left). VFPR.



Initial assessment of tree damage at Mount Philo following the 1998 ice storm indicating stand size and forest types, amount and severity of tree damage, and potential restoration cuts. In general, tree boles were broken off at about 40 feet.

APPENDIX 4: Public Comment Summary

MOUNT PHILO STATE PARK

Public Input Summary and Response to Comments

May 2017

Public input was received at an initial scoping meeting in 2013, through a recreation survey in 2014, at a recreation-focus meeting in 2016, and through written comments, emails, and personal communications. Public input is summarized topically below with a response where appropriate.

HIKING TRAILS

- **Numerous comments and suggestions were made regarding the feasibility and potential for adding hiking trails at the state park to address issues of high visitation, crowded trails, increased opportunities.** Public comment and visitor use surveys repeatedly reveal that the main visitor attraction to MPSP is its healthy forests and spectacular views. Maintaining that valued setting for high quality, well-managed hiking-focused recreation requires careful planning. More trails may better distribute use and offer new opportunities; too many trails negatively impact the resource and experience. Finding that balance is important. This LRMP prescribes the designation and design of two new trail segments on the north parcel, including the re-design of the road at the northern boundary, that can in combination with existing trails, provide an alternate hiking route to the summit.
- **Several comments suggested the consideration of creating a 'loop trail' rather than an up-and-back trail system.** In general, a loop trail is much more desirable than an up and back trail. The addition of two proposed new trail segments on the north parcel can contribute to a loop hike when combined with segments of existing trails and roads. Hiking the new trails on the north side (beginning at the lower parking), crossing the road to the campground access road, then connecting to the campground trail and summit trail then returning via the Summit trail to the House Rock trail, one can essentially hike a loop with only a short segment of the Summit trail repeated. This plan leaves the east side of the property as natural and undeveloped without any designated hiking trails.
- **Would like to see Devil's Chair Trail continued to the summit.** The Devil's Chair Trail is a narrow, more primitive hiking trail at the base of the cliff band. Ongoing maintenance has and will continue to be done to address soil loss, ongoing use and establishment of unauthorized trails, impacts (trampling) to rare plants, and cliff scrambling. Despite this maintenance, the trail cannot be made to support the high use seen on other trails on MPSP. Expansion of this trail would be cost prohibitive, would increase use on this primitive trail, and would negatively impact rare plants and fragile soils. The Devil's Chair Trail will not be expanded to reach the summit. This trail serves as an alternative, more primitive hike within the state park. Hikers who wish to continue to the summit can do so along the park road via the Old Carriage Road Trail.

- **Reroute trail to avoid road walking.** Due to the configuration of the road system at MPSP, many of the trails start, end at, or cross the road at various locations. Additionally, many hikers vary their hiking experience by connecting trails via road segments or walking the road to the summit. There is currently one connection – House Rock Trail to Summit Trail that requires a hiking along a short segment of road. The lower Summit Trail relocation designed to improve trail sustainability and safety will also realign the Summit and House Rock Trails to cross the road directly across from each other rather than separated by 300 feet of road.
- **Create primitive trail with minimal clearing, signing or tree removal**. Hiking is an extremely popular pastime at MPSP and trails need to be sustainably built and managed in order to support an intense level of use in all seasons, while protecting the natural resources that serve as the setting. There are many other state properties that support primitive and remote hiking experiences that are better suited to meet that expectation. That said, we will continue to maintain the undeveloped character of the north part of the state park property for wildlife habitat and for hikers who prefer to take a walk in the woods in a quieter setting.
- **A number of comments suggested the need for more education regarding seasonal trail closures, hiking ethics, resource damage, soil loss, etc.** More information can and should be presented in a number of ways to address issues and opportunities at MPSP. Trail and interpretive signs, kiosk information, website information, increases in staffing for in-person contacts, etc. all present opportunities to deliver information to park visitors and hikers.
- **Need to manage short cuts, side trails, unofficial trails outside of designated trail system**. Hikers, neighbors, and visitors creating unauthorized and unofficial trails create management problems that need constant attention. Despite repeated closures of these trails, they continue to be cleared and used. Some of these trails are in sensitive areas, many impact rare and uncommon plants, lead to soil loss, and damage to forest vegetation. They confuse other hikers that are unknowingly following them and can lead to impacts to the aesthetics of the park. FPR will continue to close these trails by brushing and signing.
- **Some comments related to trail damage and high visitor use were directed at managing trail quality and trail damage by finding trail solutions - manage damage not the number of users. Other comments thought the recent trail work was well done while others do not like hardened trail surfaces.** Managing the trail system at MPSP while keeping the character of a state park trail, in light of high and increasing visitation, is a challenge. Narrow, natural-surfaced trails have worked at MPSP for years and are well suited for many state parks and state forests with lower hiker visits, however, these trail conditions no longer support the number of hikers at MPSP. Over the past decade, trail use has risen and trail quality has suffered. There are a number of contemporary trail management techniques that can improve durability and prevent trail degradation from intense use. FPR will continue to sustainably manage the trail system by maintaining trail structures and erosion control features, reinforcing trail tread by adding gravel in critical locations, and relocating sections of trail to a more sustainable grade. Those measures can contribute to a quality trail but, by definition, move the trail toward a more 'urban' feel. Trail infrastructure management alone cannot address impacts to trails at MPSP. High visitation must also be addressed related to ongoing impact to trails, vegetation, and quality of the hiking experience.

MOUNTAIN BIKE TRAILS

- **Create mountain bike trail at MPSP**. There are no plans to create mountain bike trails at MPSP. The hiking trails at MPSP see some of the highest visitation in the state. Allowing coincident mountain bike use with high levels of hikers and dogs would be unsafe and would detract from the enjoyment of many. The park is relatively small and creating a mountain bike trail of enough length as to be enjoyable would change the character of MPSP and recreational experiences sought.

HIGH VISITATION

- **There were many comments, suggestions and discussion about increasing popularity and visitation at MPSP. Comments ranged from the understanding that the popularity of the park is important to the dramatic increase in use and contributes to a decrease in quality of experience, especially challenging with people and dogs. There was recognition that park visitation is increasing unsustainably. Suggestions included limiting park visitation by limiting parking; stop promoting MPSP; limiting the number of people per day; and advertising opportunities at other parks when limit is reached. Other suggestions included extending hours of daily operation or length of season to discourage use (more fees); adding more staff to support use and enforce rules; and adding more trails to spread use.** Visitation at a state park is a great thing; to a point. Hosting a venue that helps people be active outdoors, appreciating the beauty and natural resources of Vermont is critically important, however we also have a responsibility to protect Vermont's natural resources – the very setting so important to these recreational pursuits. To that end we have a responsibility to manage the resources, visitation and facilities together, in balance, to sustainably provide a high quality, well-managed recreational experience. There are several management actions that can be taken, and include the following: Parking will remain at its current level, we will work with partner organizations to highlight recreation opportunities at other nearby parks, and two additional hiking trails will be designed and designated on the northern parcel that in combination with existing trails can create a loop and alternate hike to the summit.
- **Maintain as quiet, natural.** Unfortunately, the high visitation at MPSP makes it challenging to maintain the quiet, natural feel one would find on other more remote state lands. However, the LRMP includes strategies to maintain the character of MPSP including placing limits on numbers of school groups and events. The east side of the park property will remain undeveloped with only the current winter use VAST trail. The north side (Allmon parcel) will have hiking trails designed and designated, but remain a quieter area without facilities, events and organized activities.

DOGS

- **Dogs were a popular and important topic during most public meetings and the subject of many of the comments received. Comments ranged from love to hate regarding the presence of dogs at MPSP. Not surprisingly the increase in visitor use comes with an increase in dog visits to the state park. Some visitors felt intimidated by dogs while others felt that dogs are part of experience.** Dog visitation is a popular use of MPSP and other area parks and this increase in use is resulting in an increase in incidents and confrontations between dogs and people and dogs. For many, dogs are part of the family and part of the hiking experience. For others, they are a source of anxiety. Allowing well behaved dogs on leash, at all times provides a compromise. FPR will take steps to ensure that park visitors have control over their dogs, follow leash regulations, pick up and remove all waste, and practice acceptable pet/trail ethics with the expectation that they will not interact with other dogs, adults or children, unless invited. We will seek funding for increased staff to educate visitors on dog rules and responsible dog ethics. If this cannot be reasonably achieved, the department will pursue a rule that dogs must be on least at all times (day and year) and if necessary, find means to enforce and impose consequences in addition to current method of politely requesting compliance.
- **Would like to see rules enforced for dog use at MPSP.** Vermont State Parks generally allow dogs in parks and on trails. While there are restrictions regarding dogs in most day use areas, there are specific exceptions - they are allowed in the picnic area at Mt. Philo. These rules state that dogs must be on a leash less than 10 feet in length at all times. Enforcing these existing rules during times (of day and season) when staff are not present is the challenge. Increasing staff levels, extending the hours of daily operation and length of season can help with the ability of staff to enforce existing rules. The increasing number of dogs and dog-related incidents make it important to more consistently enforce rules.
- **Need to get the rangers to enforce the rules. Signs posted say dogs on leash always – is this allowed to be ignored before park opens. There are many incidents with dogs – someone in a position of authority needs to expand and enforce the rules before a serious injury occurs. Pets are not under control – should be on leash. People have different ideas of "under control".** Currently challenges exist with enforcement. The park is not staffed prior to 10 am or after sunset. The enforcement tools that staff have on any park regulation is to politely request compliance or request that the person leave the park. If a visitor refuses to abide by the rule and does not leave the park when requested, staff are to contact law enforcement. However, this type of park rule is not a violation of law and does not rise high in priority for law enforcement resources that are already stretched thin to enforce far more serious situations violating Vermont State laws.
- **Dogs on leash in winter is dangerous (ice).** Hiking in winter at MPSP can be dangerous. Heavy use of the trails and roads in winter compacts snow and forms ice. Other, safer, trail and hiking experiences should be sought when those conditions exist.
- **Like off leash before 10 am** (park opening)**, on leash after 10am. Feel that the worst dog interactions are when they are on leash.** Dogs on leash and under owner control should not

result in negative interaction. MPSP is not a good place for aggressive or unsocialized dogs (to other dogs, people or kids).

- **There were numerous comments and suggestions around the topic of dog waste, lack of clean up, need for additional dog-waste stations at summit and education on this topic.** Picking up dog waste is the responsibility of the pet owner. Some dog-waste stations are provided with a supply of bags for waste and a dumpster is located at the base parking area for its bag disposal. Bags should not be left along trails and all waste must be picked up. Pet owners should come prepared with their own bags for waste in case none are available when and where needed. A volunteer now fills the pickup station with bags in the off season.
- **Should charge an extra fee for dogs, similar to that for camping with dogs.** Extra fees are charged for camping with dogs in Vermont state parks. Although not consistent with current rules and would require a rule making process with public input we will consider this in the future.
- **Consider some type of zone management for dogs. Consider limiting dogs to road hiking or experiment with dog limits on some trails. Other suggestions included no dogs at summit picnic (day use) like other parks.** It is an interesting idea but without better enforcement (see above) it would be difficult to administer. There would still be coincidental use at trailheads and parking where many negative incidents occur.
- **Support educational efforts on dog management and etiquette related to hiking with dogs. Define and educate about 'dog friendly' – what it is and where it can occur.** We can provide education via signage and information on kiosks. Ideally, however to conduct 'canine good citizen' tests and outreach require additional staff. In our experience signs do not solve this type of behavioral problem; it is in-person contact and programming that can be successful and requires additional staff.

OBSERVATION TOWER AND VIEWS

- **A few comments were directed at the idea of replacing the old tower (removed in the 1970s) at the summit.** FPR does not have plans to replace the observation tower at the summit. The views from the summit and several other locations within the park are spectacular and popular. A tower represents a maintenance liability.
- **Several comments related to reestablishing and maintaining historic views and increasing views from various locations within the park including the north summit. This is a natural area, we don't need to better facilitate views over what is there now.** MPSP is popular, in part, for its spectacular views of the Champlain Valley from the main summit and to the north, west and east from the north summit. But MPSP is also valued for its healthy forests and natural setting and so management will continue to maintain a combination of views and healthy forest.

INVASIVE SPECIES

- **Control invasive species.** Addressing the presence and spread of terrestrial invasive plant species is an important priority for state lands management. FPR will continue to map, assess

and set priorities for invasive species. Priorities will focus invasive species in areas of intact forest and habitat and rare and uncommon plants, species that are particularly invasive (i.e. oriental bittersweet, wild chervil), and species that pose a threat to human health (i.e. poison parsnip). Complete control is usually not achievable but by focusing management on mitigating impact of invasive species and protecting important resources, some success can be achieved.

- **Control poison parsnip in meadow.** Poison parsnip is a particularly aggressive species that can alter habitat over a relatively short time. It's spread is compounded by roadside mowing and widespread seed sources. There are also human health implications - its sap can cause burns on skin when exposed to sunlight. The meadow at the park entrance will be managed as important herbaceous/shrubland habitat for songbirds, pollinators, bats, reptiles, etc. To that end, the poison parsnip will be managed in blocks by instituting an aggressive mowing regime for several years, possibly combined with manual removal of plants and rotating sections of meadow until parsnip can be contained. Maintaining an aggressive mowing regime over the long term can be problematic since the timing of mowing (each time the plant blooms) conflicts with recommendations for mowing to protect nesting birds, reptiles and amphibian movement, and bloom times necessary for pollinators. There is also question about how effective this strategy can be over the long term with seed sources on surrounding lands. The best hope is that it can control the population enough to allow for success in manual control (snipping flowers or digging plants), perhaps with volunteers.

HISTORIC RESOURCES

- **Remove chain link fence and replace with something more historically appropriate.** Most of the chain link fencing was removed and replaced with fencing with iron cross bars consistent with historic fencing at MPSP. The only section of chain link that remains is at the lower/northern vista and offers added safety for that steeper drop off.
- **Interpret historic resources.** There is a long and interesting history to the recreational use of Mt. Philo. FPR priorities for interpretation include natural resources (geology, rare species), past land use, Civilian Conservation Corps, and Native Americans. The primary goal related to historic resources is protection. This is done by conducting appropriate archeological review prior to any ground disturbing management activity. Beyond that we feel it is important to document historic resources and, as practical and appropriate to interpret those resources for the public. Feasibility is critically linked to funding availability but it is also important to consider the risk to historic resources as they are made 'public' and to find that balance between education and protection.
- **Rebuild gazebos along road to summit.** The historic gazebos of the early 1900s existed when horses, and then early automobiles used the carriage road. Stopping along the road was less problematic. Today, with modern vehicles, hikers, bikers and high visitation stopping along the narrow road is problematic, would impede traffic flow, and would be unsafe. Improvements to safety (i.e. pull-offs) would require road modifications that are not possible

due to terrain. These were interesting historical structures and their discussion will be rolled into other interpretive projects at the summit.

MEADOW MANAGEMENT

- **Several comments related to management of meadows/fields for habitat for birds, etc. and in managing to control invasive species, particularly poison parsnip.** See comment under invasive species management above.
- **Lease fields for agricultural use (hay, sheep).** The herbaceous/shrubland fields at MPSP provide important habitat for songbirds, pollinators, reptiles and mammals. These fields will be managed for native species that support that goal and contribute to this type of habitat statewide.

SNOWMOBILE USE

- **There were several comments supporting snowmobile use as part of the winter experience in the park. These comments supported keeping the VAST trail in its current location on the park road, specifically mentioning the value of having machine-packed snow.** For many years the snowmobile trail has passed east-west through MPSP along the park road. Its location was moved to the first switchback up the entrance road in order to accommodate, and separate, winter uses (sledding, snowboarding). There is potential for conflict as popular winter activities vie for the limited snow conditions in the Champlain Valley.
- **VAST would like to partner/communicate with other park users, cooperating so can all work together for common goal even though each seek different forms of recreation within the state park.** MPSP is popular for a variety of recreational uses, particularly in winter. Cooperation between uses and user groups is critical.
- **The local VAST club has reported repeated sign vandalism and illegal removal creating a confusing and unsafe situation for all park visitors.** Signs are an important means of communicating trail uses and alerts, rules and regulations and direction and safety. It is important that they are installed and remain in place. It is the responsibility of VAST to pay for and maintain signs under their statewide Cooperative Agreement with FPR. It is illegal to remove or vandalize these signs.
- **Some comments suggested that the VAST trail be relocated from the park entrance road to the road at the northern boundary.** FPR has decided that for the current time the VAST trail will remain in its location on the park road. This will provide the northern road/trail to remain as an area for quiet recreation. Should conflicts continue this will be re-evaluated.

PARKING

- **There were many comments related to limiting parking as a means to controlling high use. Some suggested closing the park to entry when those lots were full.** FPR agrees with this approach. Expanding parking to meet demand would put incredible pressure on existing facilities, staff and natural resources and decrease meadow/shrubland habitat for songbirds and pollinators.
- **Many comments suggested finding new and increased parking solutions.** FPR will not be expanding parking areas. The parking lot at the top occupies a significant area of the summit with no opportunities to expand without significantly impacting recreational use and natural resources. The lower lot was constructed according to town zoning at the maximum size. Expansion of that lot would violate the permit, impact songbird and pollinator habitat and continue to facilitate greater increases in use and associated impacts on trails, water, and facilities.
- **There is a need to address parking lot security and vandalism.** Parking lot break-ins have occurred sporadically over the years with a recent spike in number of incidents. Signs have been posted to remind hikers to lock vehicles and either remove or hide valuables. FPR has been and will continue working with Vermont State Police.
- **Parking along town roads outside of park is a safety concern.** FPR agrees and will work with the town and Vermont State Police to pursue no parking on roads due to safety concerns. If necessary, Vermont FPR will fund extra patrol.

COARSE WOODY MATERIAL

- **There were several comments related to trees, branches, and brush on the forest floor and the impact to aesthetics and visitor experience that results.** Standing dead and dying trees and downed dead trees and brush are vital components of a healthy forest that provide habitat for wildlife ranging from mammals to invertebrates; play an important role nutrient cycling, soil erosion protection and water availability; all elements of a healthy and resilient forest. Overall, about one-third of New England's forest wildlife makes use of dead and dying wood features, including cavity trees, snags, downed wood and large trees. One strategy for protecting soil is to maintain or enhance coarse woody material to replenish organic matter, moderate temperatures and recycle nutrients.

GROUPS

- **There were many comments related to high visitation and the impact of large groups (schools, tours, events, etc.) on the resources, trails and recreational experience of park visitors.** We will take measures to reduce the pressure from large groups and high numbers of group events to alleviate pressure on natural resources, trails, park facilities, and the quality of recreational experiences for other visitors. FPR will require that large groups, including

school groups, to reserve a day to visit the park and restrict that use to one group/school per day. Limits will be placed on group shelter events at the summit to alleviate parking pressure and we will restrict group use to the shelter (i.e. no set up in lawn, no set up of 60 chairs in lawn area for use by groups) to preserve turf and prevent erosion and to preserve the quality of experience of other visitors including small, private groups, families and individuals. Fundraising and commercial event use of Mt. Philo will be phased out. Large hiking groups will be divided into smaller groups of 10 on trails to reduce impact. While we want to accommodate some school groups to meet our interpretive goals we must do something to reduce pressure on resources.

EDUCATION/INTERPRETATION

- **There were a number of comments related to the recognized need for increased information, education and interpretation.** Increased efforts will be made to place strategic trail directional signs, develop appropriate natural-resource and history-related interpretive signage, to post current information on the trailhead kiosk related to trail/hiker ethic and dog-owner responsibilities. Funding for increases in staff levels would help to meet these goals.

STATE PARK FACILITIES

- **There were many comments related to park facilities, some for increased facilities (restrooms, wedding gazebo, welcome centers) and others that supported the status quo and related 'feel' of experience.**
- **More structures would change feel of experience. Many visitors have stated that they are attracted to Mt. Philo State Park for the forest-based hiking, the rustic, and the natural experience.** We agree, creating more structures and more developed facilities would change the character of the state park. More development would also attract more visitors, not only changing the character of MPSP but also placing greater impact on facilities, natural resources and the quality of visitor experience.
- **Construct a wedding gazebo on north slope.** The north slope, just north of the campground, will remain an undeveloped, as a quiet alternative to the developed summit of Mt. Philo and will have no facilities constructed.
- **Construct a welcome center at base.** We believe that constructing a welcome center would draw more visitors to MPSP and take up space valuable for parking and meadow/shrubland habitat. We would support a welcome center in The Town of charlotte but not on state property.
- **Add frisbee golf.** Designating a frisbee golf course is not compatible with the limited open space and high visitation at MPSP.
- **Add more toilets at bottom and middle of mountain.** It would be extremely difficult to site toilets mid-mountain and if located close to the road, they would create a draw to stop resulting in traffic congestion and safety issues. Having a composting toilet half-way up a 0.5-

mile trail is not a priority. More toilets at the bottom will take up parking spots or meadow/shrubland habitat.

STAFF LEVELS / FEES

- **Numerous questions and points were made regarding increasing staffing levels and hours and season of park operation**. Yes, we would like to. We are trying to identify opportunities to make staff increases that would be necessary to support longer hours and season as well as provide more outreach to visitors.
- **There were also many questions and comments related to park operation budgets and fee increases. Many comments related to educating the public on existing fees, fully evaluating the cost of running the park, and finding creative fundraising opportunities (name on bench, friends pass).**
- **Money should follow metrics – higher earning parks get more funding.** At this time, all park receipts go into a department-wide fund and are distributed per our annual budget. Budge is determined based on goals and needs statewide. Often parks with higher use have more needs and are likely to receive more funding, but funding is not directly related to higher earnings. Trail maintenance is funded using Recreation Trails Program funds (Federal Highway grant program). Funds are applied for and awarded based on district and statewide priority.

PARK BOUNDARY

- **Is there plan to install fencing along boundaries?** ANR boundary lines are designated on the ground with orange-painted blazes and periodic state lands tags. Boundaries are regularly maintained and paint freshened every 10-15 years. Some boundaries have existing fencing. We do not install or maintain fence.
- **Neighboring properties should be buffered from trails.** Currently, all trails on MPSP are well away from boundaries with neighbors. The north trail that is proposed in this plan is close to the boundary in places but will follow an existing route and is not near any houses.
- **Close off short cuts and side trails.** Unauthorized trails impact the natural resources at MPSP. They are not professionally designed or designated by FPR and often have no measures to control soil loss, protect rare or uncommon species, and do not meet the goal of creating a sustainable trail system. There is continual effort to close off short cuts by adding brush, signs or fence. Trail segments have been relocated to attempt to reduce the incidence of short cuts. We will continue those efforts. Side trails, most to adjacent landowners, are also an ongoing issue and measures to close them will continue as well.

PARK ROAD SYSTEM

- **There were many comments related to wanting less vehicle traffic on mountain road (park access road).** The road is steep and challenging to drive, especially in spring and winter (ice) and fall (wet leaves) when it can be slippery and dangerous. For those

reasons, it is closed to vehicle traffic during those times. The road was in existence long before this became a state park. It would probably not be constructed today. It does, however, provide access to the summit for those unable to hike and for supporting events at the shelter. The road is only open to vehicles from mid-May to mid-October.

- **Install benches along road. Create wide spots where people can rest or let cars pass.** Creating larger pull-offs along the road would lead to cars parking in them, traffic congestion and safety issues. We could add very small spots (too small for vehicles) in strategic locations along the road with benches for walkers to rest.
- **The Allmon road never permitted with the town and has drainage issues.** The Town of Charlotte did issue a permit for the construction of the "allmon" road (North Road). The road was constructed with ditches and culverts and is surfaced with gravel. Road maintenance will address the lower culvert and re-direct the its drainage so that it drains only onto state land.

EVENTS

- **Plan more evening events.** Interpretive events would be nice but would depend on staffing levels. We don't have an interpreter at MPSP.
- **There were numerous comments regarding the road rally – both for and against. Some comments suggested that there be no road rally, that it damages resources, is not in spirit of the park, and closes public land to the public. Others felt that it was an appropriate use but should be held at a different time (not foliage season).**
- **Road rally denies public access to public land during foliage season. Doesn't seem appropriate to close one of the most popular parks to all public access during peak foliage – road rally – choose another location for race, allow people to still hike trails, allow spectators, hold during another weekend (couple of weekends later), pass out maps to help people find other places to hike, publicize race so people know park closed. Not opposed to the event but opposed to the 'pay to play' model where someone can pay thousands of dollars to deny public access to public lands.** The organizers do not wish to hold it at a different time of year because of seasonal, weather and road conditions. The event has been determined to be incompatible with park operations and increasing year-round visitation.

APPENDIX 5: Recreation Survey

2014 Recreation Survey: Mt. Philo State Park
Survey Results Summary

Question: **How do you use the lands within Mt. Philo State Park?**
Respondents: 458; skipped: 2

Answer choices	Responses
Hiking on roads	79.04%
Hiking on trails	87.34%
Hunting	1.97%
Camping	12.66%
Wildlife viewing	45.20%
Birding	26.42%
Dog walking	40.17%
Day use/picnicking	58.95%
Snowshoeing	28.38%
Cross-country skiing	12.45%
Snowmobiling	3.71%
Sledding	29.69%
Trail running	15.72%
Road running	11.79%
Other	15.07%

Question: **Which values or public benefits are most important to you regarding the management of Mt. Philo?**
Respondents: 457; skipped: 3

	High importance	Medium Importance	Low Importance	No Importance	Total
Recreation	78.08% (349)	19.69% (88)	1.79% (8)	0.45% (2)	447
Wildlife habitat	71.24% (322)	24.78% (112)	3.76% (17)	0.22% (1)	452
Resource protection	70.31% (315)	24.33% (109)	5.36% (24)	0.00% (0)	448
Aesthetics	62.64% (275)	31.21% (137)	5.92% (26)	0.23% (1)	439
Vegetation management	49.88% (216)	39.26% (170)	10.16% (44)	0.69% (3)	433
Interpretation/education	21.21% (91))	48.02% (206)	27.51% (118)	3.26% (14)	429
Revenue generation	3.77% (16)	28.77% (122)	46.70% (198)	20.75% (88)	424

Question: **When do you typically visit Mt. Philo State Park?**
Respondents: 454; skipped: 6

Answer choices	**Responses**
Weekends	38.55% (175)
Weekdays	11.23% (51)
All days	50.22% (228)

Question: At what time of day do you typically visit Mt. Philo State Park?
Respondents: 447; Skipped:13

Answer choices	**Responses**
Before 10 am	34.0% (152)
Between 10 am and Noon	41.16% (184)
Between Noon and 5 pm	52.35% (234)
Between 5 pm and 9 pm	27.29% (122)
After 9 pm	3.58% (16)

Question: **How important to you are the following considerations in the management of Mt. Philo SP?**

	Not important	Somewhat important	Absolutely important	Don't know	total
Economic	16.36% (71)	58.76% (255)	16.82% (73)	8.06% (35)	434
Social	11.67% (51)	43.02% (188)	37.99% (166)	7.32% (32)	443
Ecological	7.0% (31)	14.67% (65)	74.72% (331)	3.61% (16)	443
Educational	7.82% (34)	53.79% (234)	32.87% (143)	5.52% (24)	435

Question: **How many times did you visit Mt. Philo State Park in the last year?**
Respondents: 457; skipped: 3

Answer Choices	**Responses**
Never visited the park	1.09% (5)
1-5 visits	43.11% (197)
6-10 visits	21.88% (100)
11-20 visits	14.44% (66)
21-50 visits	12.47% (57)
More than 50 visits	7.0% (32)

Question: **How satisfied are you with the following activities on Mt. Philo State Park?**
Respondents: 453; skipped: 7

	Unsatisfied	**Somewhat satisfied**	**Neutral**	**Somewhat satisfied**	**Satisfied**	**NA**	**Total**
Hiking	0%	2.23% (10)	2.23% (10)	17.41% (78)	76.56% (343)	1.56% (7)	448
Camping	0.46% (2)	0.92% (4)	10.55% (46)	5.73% (25)	16.28% (71)	66.06% (288)	436
Hunting	2.58% (11)	1.41% (6)	8.90% (38)	0.70% (3)	3.28% (14)	83.14% (355)	427
Forest/habitat Management	0.46% (2)	3.88% (17)	12.10% (53)	30.14% (132)	41.78% (183)	11.64% (51)	438
Viewing scenery	1.11% (5)	2.0% (9)	1.11% (5)	11.56% (52)	83.78% (377)	0.44% (2)	450
Wildlife viewing	0.45% (2)	3.40% (15)	11.79% (52)	26.98% (119)	49.43% (218)	7.94% (35)	441
Picnicking	0% (0)	0.45% (2)	8.18% (36)	18.18% (80)	63.86% (281)	9.32% (41)	440
Interpretive programs	0.94% (4)	3.53% (15)	18.82% (80)	9.65% (41)	6.82% (29)	60.24% (256)	425

Question: **Do you think the amount of designated hiking trails, park access roads and snowmobile trails are just right, too little, too much?**
Respondents: 445; skipped: 15

	Just right	**Too little**	**Too much**	**Total**
Hiking	66.74% (293)	31.21% (137)	2.05% (9)	439
Snowmobile	50.31% (161)	3.75% (12)	45.94% (147)	320

APPENDIX 6: Works Cited

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APPENDIX 7: Glossary

The following is a series of key words and their definitions used in the development of Long Range Management Plans for Vermont Agency of Natural Resource lands.

Acceptable Management Practices (AMPs). In this plan, a series of erosion control measures for timber harvesting operations, as identified in state statutes. The AMPs are the proper method for the control and dispersal of water collecting on logging roads, skid trails, and log landings to minimize erosion and reduce sediment and temperature changes in streams.

Acceptable Growing Stock (AGS). AGS trees exhibit form and appearance that suggests they will maintain and/or improve their quality and can be expected to contribute significantly to future timber crops in the form of vigorous high quality stems. They contain or may potentially produce high or medium quality sawlogs.

Age Class. One of the intervals, commonly 10 to 20 years, into which the age range of forest trees are divided for classification or use. Also pertains to the trees included in such an interval. For example, trees ranging in age from 21 to 40 years fall into a 30-year age class; 30 designates the midpoint of the 20-year interval from 21 to 40 years.

All-aged (Uneven-aged) system. Timber management which produces a stand or forest composed of a variety of ages and sizes. Regeneration cutting methods in this system include single tree selection and group selection.

Basal area. A measure of the density of trees on an area. It is determined by estimating the total cross-sectional area of all trees measured at breast height (4.5 feet) expressed in square feet per acre.

Best management practices. A practice or combination of practices determined to be the most effective and practicable means of preventing negative impacts of silvicultural activities.

Biodiversity. The variety of plants and animals, their genetic variability, their interrelationships, and the biological and physical systems, communities, and landscapes in which they exist.

Biophysical region. A region with shared characteristics of climate, geology, soils, and natural vegetation. There are currently eight biophysical regions recognized in Vermont.

Block. A land management planning unit.

Browse. The part of leaf and twig growth of shrubs, vines, and trees available for animal consumption.

Canopy. The more or less continuous cover of branches and foliage formed collectively by the crowns of adjacent trees and other woody growth.

Capability. The potential of an area to produce resources, supply goods and services, and allow resource uses under an assumed set of management practices and at a given level of management

intensity. Capability depends on current conditions and site conditions such as climate, slope, landform, soils, and geology as well as the application of management practices such as silvicultural protection from fire, insects, and disease.

Cleaning (Weeding). Regulating the composition of a young stand by eliminating some trees and encouraging others, and also freeing seedlings or saplings from competition with ground vegetation, vines, and shrubs.

Clearcutting. A cut which removes all trees from a designated area at one time, for the purpose of creating a new, even-aged stand.

Commercial forest land. Land declared suitable for producing timber crops and not withdrawn from timber production by statute or administrative regulation.

Conservation. The careful protection, planned management, and use of natural resources to prevent their depletion, destruction, or waste.

Conservation easement. Acquisition of some rights on a parcel of land designed to keep the property undeveloped in perpetuity.

Cover. Vegetation which provides concealment and protection to wild animals.

Cull Tree. Tree that does not meet regional merchantability standards because of excessive unsound cull. May include noncommercial tree species.

Cultural operation. The manipulation of vegetation to control stand composition or structure, such as site improvement, forest tree improvement, increased regeneration, increased growth, or measures to control insects or disease. Examples of methods used are timber stand improvement, cleaning or weeding, release, and site preparation.

Day Use – Visitor activity in a park, or given section of a park, that does not involve staying overnight.

DBH (diameter at breast height). The diameter of the stem of the tree measured at breast height (4.5 feet or 1.37 meters) from the ground.

Deer wintering area. Forest area with at least 70 percent conifer that provides suitable, stable habitat to meet deer needs during the winter.

Den tree. A live tree at least 15 inches DBH (diameter at breast height) containing a natural cavity used by wildlife for nesting, brood rearing, hibernating, daily or seasonal shelter, and escape from predators.

Developed (or intensive) recreation. Activities associated with man-made structures and facilities that result in concentrated use of an area. Examples are campgrounds and ski areas.

Diameter at breast height (DBH). The diameter of the stem of the tree measured at breast height (4.5 feet or 1.37 meters) from the ground.

Dispersed recreation. Outdoor recreation activities requiring few, if any, support facilities.

Down woody material (DWM). DWM is also referred to as coarse woody debris, woody material, and down woody debris. DWM is comprised of woody material left in the woods from harvested trees as well as portions or whole trees that die and fall naturally.

Ecological processes. The relationships between living organisms and their environment. Among these processes are natural disturbances such as periodic fire, flooding, or beaver activity; natural stresses such as disease or insects; catastrophic weather-related events such as severe storms or lightning strikes; or more subtle ongoing processes such as succession, hydrology, and nutrient cycling.

Ecological reserve. An area of land managed primarily for long-term conservation of biodiversity.

Ecosystem. A complex array of organisms, their natural environment, the interactions between them, the home of all living things, including humans, and the ecological processes that sustain the system.

Ecosystem management. The careful and skillful use of ecological, economic, social, and managerial principles in managing ecosystems to produce, restore, or sustain ecosystem integrity, uses, products, and services over the long-term.

Endangered species. A species listed on the current state or Federal endangered species list (VSA Title 10, chapter 123). Endangered species are those which are in danger of becoming extinct within the foreseeable future throughout all or a significant portion of their range.

Even-aged system. Timber management that produces a forest or stand composed of trees having relatively small differences in age. Regeneration cutting methods in this system include clearcutting, seed tree (seed cut) method, and shelterwood method.

Forest health. Condition in which forest ecosystems sustain their complexity, diversity, resiliency, and productivity.

Forest type. A natural group or association of different species of trees which commonly occur together over a large area. Forest types are defined and named after the one or more dominant species of trees, such as the spruce-fir and the birch-beech-maple types.

Forestry. The art and science of growing and managing forests and forest lands for the continuing use of their resources.

Fragmentation. Division of a large forested area into smaller patches separated by areas converted to a different land use.

Game species. Animals habitually hunted for food, particular products, sport, or trophies.

Gap. An opening in the forest canopy caused by the death or harvest of one or several overstory trees.

Geographic Information Systems. A computer-based means of mapping lands and resources and communicating values associated with them (GIS).

Green certification. A process, sponsored by several international organizations, that promotes sustainable forest management practices, providing a marketplace identify for forest products certified to have been grown and manufactured in a sustainable manner.

Group Selection. The removal of small groups of trees to meet a predetermined goal of size, distribution, and species.

Habitat. A place that provides seasonal or year round food, water, shelter, or other environmental conditions for an organism, community, or population of plants or animals.

Hardwood. A broad leaved, flowering tree, as distinguished from a conifer. Trees belonging to the botanical group of angiospermae.

Healthy ecosystem. An ecosystem in which structure and functions allow the maintenance of the desired conditions of biological diversity, biotic integrity, and ecological processes over time.

Heritage Sites. Sites identified by the Vermont Nongame and Natural Heritage Program of the Department of Fish and Wildlife, which have rare, threatened, or endangered species of plants or animals. Heritage sites are identified using a common standards-based methodology, which provides a scientific and universally applicable set of procedures for identifying, inventorying, and mapping these species.

Intensive (or developed) recreation. Outdoor recreation activities requiring major structures and facilities.

Interior dependent species. Those wildlife species that depend on large unbroken tracts of forest land for breeding and long term survival. The term is also often used in conjunction with neotropical migratory bird species requiring large patches of fairly homogeneous habitat for population viability**.**

Intermediate treatment. Any treatment or tending designed to enhance growth, quality vigor, and composition of the stand after its establishment or regeneration and prior to the final harvest.

Invasive Exotic (Non-native). A species that is 1) non-native (or alien) to the ecoregion or watershed under consideration and 2) whose introduction does or is likely to cause economic or environmental harm or harm to human health.

Land conservation. The acquisition or protection through easements of land for wildlife habitat, developed state parks, and working forests.

Landscape. A heterogeneous area of land containing groups of natural communities and clusters of interacting ecosystems. These can be of widely varying scales but normally include a range of elevations, bedrock, and soils.

Mast. The fruit (including nuts) of such plants as oaks, beech, hickories, dogwood, blueberry, and grape, used for food by certain wildlife species.

Motorized use. Land uses requiring or largely dependent on motor vehicles and roads.

Multiple-use forestry. Any practice of forestry fulfilling two or more objectives of management, more particularly in forest utilization (e.g. production of both wood products and deer browse).

Multiple-use management. An onsite management strategy that encourages a complementary mix of several uses on a parcel of land or water within a larger geographic area.

Native (species). A plant or animal indigenous to a particular locality.

Natural Area. Limited areas of land, designated by Vermont statute, which have retained their wilderness character, although not necessarily completely natural and undisturbed, or have rare or vanishing species of plant or animal life or similar features of interest which are worthy of preservation for the use of present and future residents of the state. They may include unique ecological, geological, scenic, and contemplative recreational areas on state lands.

Natural community. An assemblage of plants and animals that is found recurring across the landscape under similar environmental conditions, where natural processes, rather than human disturbances, prevail.

Nongame species. Animal species that are not hunted, fished, or trapped in this state. This classification is determined by the state legislature.

Northern hardwood. Primarily sugar maple, yellow birch, and beech. May include red maple, white ash, white birch, black cherry, red spruce, and hemlock.

Old growth forest. A forest stand in which natural processes and succession have occurred over a long period of time relatively undisturbed by human intervention.

Outdoor recreation. Leisure time activities that occur outdoors or utilize an outdoor area or facility.

Overstory. That portion of the trees, in a forest of more than one story, forming the upper or upper-most canopy layer.

Patch Clearcut (Patch-cut). Under an even-aged method, a modification of the clearcutting method where patches (groups) are clearcut in an individual stand boundary in two or more entries. Under a two-aged method, varying numbers of reserve trees are not harvested in the patches (groups), to attain goals other than regeneration.

Pole. A tree of a size between a sapling and a mature tree.

Pole timber. As used in timber survey, a size class definition; trees 5.0 to 8.9 inches (varies by species) at DBH. As used in logging operations, trees from which pole products are produced, such as telephone poles, pilings, etc.

Regeneration. Seedlings or saplings existing in a stand. Regeneration may be artificial (direct seeding or planting) or natural (natural seeding, coppice, or root suckers).

Regeneration treatment (harvest cut). Trees are removed from the stand to create conditions that will allow the forest to renew or reproduce itself. This is accomplished under either an even-aged management system or an uneven-aged management system.

The four basic methods used to regenerate a forest are clearcutting, seed-tree, shelterwood, and selection (group selection or single tree selection).

Regeneration methods. Timber management practices employed to either regenerate a new stand (regeneration cutting) or to improve the composition and increase the growth of the existing forest (intermediate treatment).

Regulated Hunting/Fishing/Trapping. The harvest of wildlife under regulations stipulating setting of seasons, time frame of lawful harvest, open and closed zones, methods of take, bag limits, possession limits, and reporting or tagging of species.

Release (release operation). The freeing of well-established cover trees, usually large seedlings or saplings, from closely surrounding growth.

Removal cut. The final cut of the shelterwood system that removes the remaining mature trees, completely releasing the young stand. An even-aged stand results.

Riparian Area. "*The word "riparian" means of or pertaining to the bank of a river or lake. Riparian areas are ecosystems comprised of streams, rivers, lakes, wetlands, and floodplains that form a complex and interrelated hydrologic system. They extend up and down streams and along lakeshores from the bottom of the water table to the top of the vegetation canopy, and include all land that is directly affected by surface water. Riparian areas are unique in their high biological diversity. They are "characterized by frequent disturbances related to inundation, transport of sediments, and the abrasive and erosive forces of water and ice movement that, in turn, create habitat complexity and variability…resulting in ecologically diverse communities" (*Verry, E.S., J.W. Hornbeck, and C.A. Dolloff (eds). 2000. Riparian management in forests of the continental Eastern United States. Lewis Publishers, Boca Raton, FL. 402p.)

Riparian Management Zone (RMZ). The width of land adjacent to streams or lakes between the top of the bank or top of slope or mean water level and the edge of other land uses. Riparian management zones are typically areas of minimal disturbance, consisting of trees, shrubs, groundcover plants, duff layer, and a naturally vegetated uneven ground surface, that protect the water body and the adjacent riparian area from the impact of these land uses.

Salvage Cutting. The removal of dead, dying, and damaged trees after a natural disaster such as fire, insect or disease attack, or wind or ice storm to utilize the wood before it rots.

Sanitation cutting. The removal of dead, damaged, or susceptible trees to improve stand health by stopping or reducing the spread of insects or disease.

Sapling. As used in timber surveys, a size class definition. A usually young tree larger than seedling but smaller than pole, often 1.0 to 4.9 inches at DBH.

Sawlog or Sawtimber. A log or tree that is large enough (usually > than 10 or12 inches DBH) to be sawn into lumber. Minimum log length is typically 8 feet.

Seedling. A very young plant that grew from a seed.

Seed-Tree (Seed Cut) method. The removal of most of the trees in one cut, leaving a few scattered trees of desired species to serve as a seed source to reforest the area.

Shelterwood method. A series of two or three cuttings which open the stand and stimulate natural reproduction. A two cutting series has a seed cut and a removal cut, while a three cutting series has a preparatory cut, a seed cut, and a removal cut.

Silvicultural systems. A management process whereby forests are tended, harvested, and replaced, resulting in a forest of distinctive form. Systems are classified according to the method of carrying out the fellings that remove the mature crop and provide for regeneration and according to the type of forest thereby produced.

Single tree selection method. Individual trees of all size classes are removed more or less uniformly throughout the stand to promote growth of remaining trees and to provide space for regeneration.

Site Preparation. Hand or mechanical manipulation of a site, designed to enhance the success of regeneration.

Site Quality. A broad reference of the potential of forest lands to grow wood. Site class identifies the potential growth more specifically in merchantable cubic feet/acre/year.

Snag. Includes standing dead or partially dead trees that are at least 6 inches in diameter at breast height (DBH) and 20 feet tall.

Social Trail – unauthorized and undesignated trail created by members of the public.

Softwood. A coniferous tree. Softwood trees belong to the botanical group gymnospermae, including balsam fir, red spruce, and hemlock.

Stand improvement. An intermediate treatment made to improve the composition, structure, condition, health, and growth of even or uneven-aged stands.

Stewardship. Caring for land and associated resources with consideration to future generations.

Stocking. A description of the number of trees, basal area, or volume per acre in the forest stand compared with a desired level for balanced health and growth. Most often used in comparative expressions, such as well-stocked, poorly stocked, or overstocked.

Sustainability. The production and use of resources to meet the needs of present generations without compromising the ability of future generations to meet their needs.

Sustained yield. The yield that a forest can produce continuously at a given intensity of management.

Thinning. Removing some of the trees in a dense immature stand primarily to improve the growth rate and form of the remaining trees and enhance forest health.

Threatened species. A species listed on the state or Federal threatened species list. Threatened species are those likely to become endangered within the foreseeable future throughout all or a significant portion of their range.

Timber lands. Properties that are managed primarily for the maximum production of forest products.

Timber Stand Improvement. Activities conducted in young stands of timber to improve growth rate and form of the remaining trees.

Traditional uses. Those uses of the forest that have characterized the general area in the recent past and present, including an integrated mix of timber and forest products harvesting, outdoor recreation, and recreation camps or residences.

Unacceptable Growing Stock (UGS). UGS trees are high risk and are expected to decline before harvest. UGS trees are of poor form and/or low quality and cannot reasonably be expected to improve. They have the potential to produce only low quality logs or pulp-type products.

Uneven-aged (All-aged) system. Timber management which produces a stand or forest composed of a variety of ages and sizes. Regeneration cutting methods in this system include single tree selection and group selection.

Watershed. The geographic area within which water drains into a particular river, stream, or body of water. A watershed includes both the land and the body of water into which the land drains.

Weeding (cleaning). Regulating the composition of a young stand by eliminating some trees and encouraging others, and also freeing seedlings or saplings from competition with ground vegetation, vines, and shrubs.

Wilderness. Areas having pristine and natural characteristics, typically roadless and often with some limits on uses. (This is not the federal definition of wilderness.)

Wildlife habitat. Lands supplying a critical habitat need for any species of wildlife, especially that which requires specific treatment and is of limited acreage.

Working forest. Land primarily used for forestry purposes but also available for recreation, usually where both managed land and land not presently being managed is present.

Working landscape. A landscape dominated by land used for agricultural and/or forestry purposes.